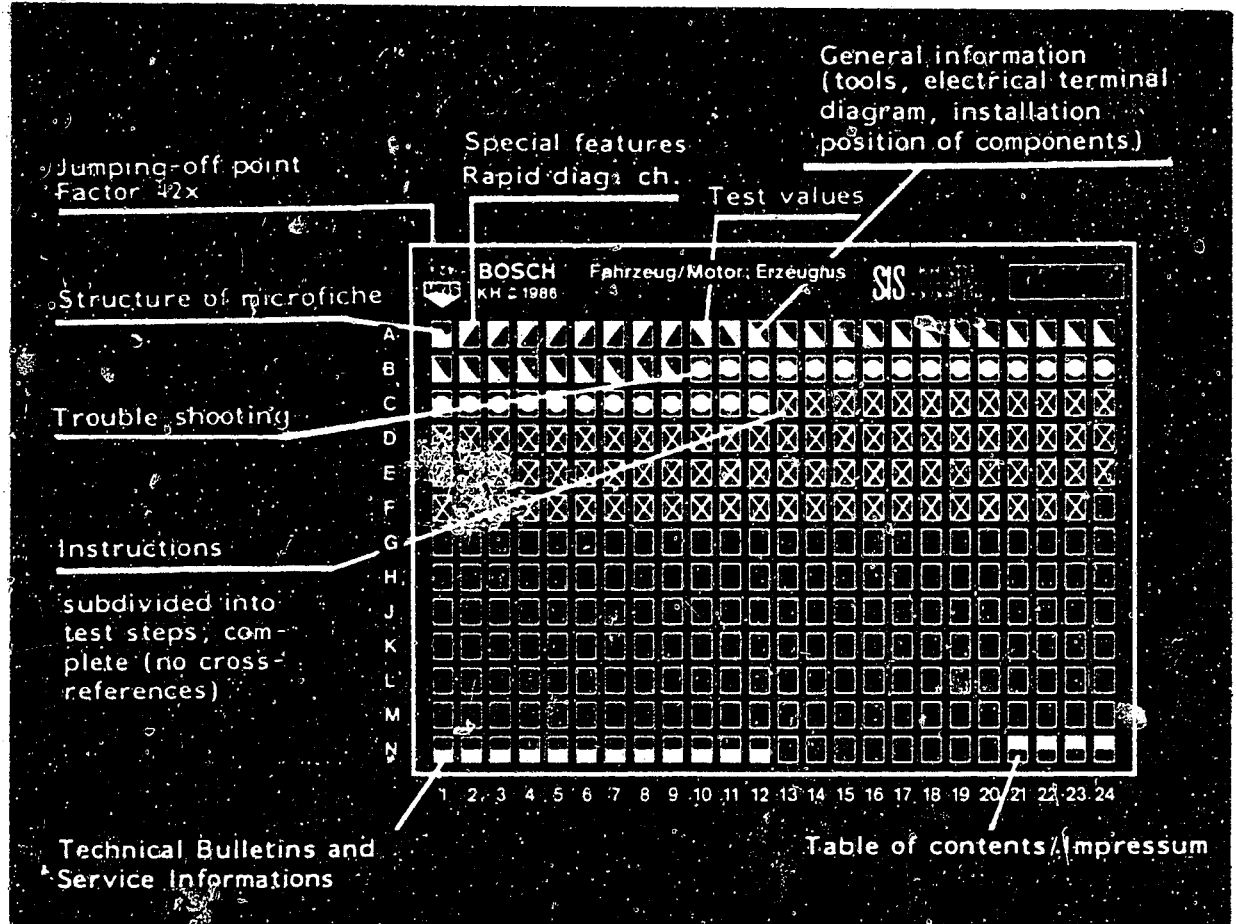


## Structure of microfiche



1. Read from left to right
2. Title of microfiche (appears on each coordinate)

<b>E 16</b>	Product/component/test step
	Vehicle/engine

Coordinate

3. Limits of section



Beginning



Mid-section



End



One-page section

4. References to relevant test steps in test specifications; coordinate e.g. C6

**C6**

**A1**

Trouble-shooting program



## 1. Special features

Peugeot 505 Turbo Injection with intercooler  
(11.85 →), engine N9TL/N9TE, 2.155 l/4 cyl., 112 -  
132 kW, equipped with EI-K as of 08.85:

Trigger box	0 227 100 123 (with current limitation)
Ignition coil	0 221 122 317
Spark-advance mechanism	0 227 921 024
Knock-control device	0 261 201 002
Knock sensor	0 261 231 001

## 2. Rapid diagnosis chart

The rapid diagnosis chart beginning at coordinate A4 makes it possible for the experienced expert to quickly check the ignition system using the necessary test equipment and aids.

The rapid diagnosis chart contains the test step sequence, possible cause of fault, test instructions, test specifications and coordinate details.

### Using the rapid diagnosis chart

The rapid diagnosis chart as of coordinate A4 must be used when there is a primary signal and/or an igniton spark available.

The rapid diagnosis chart as of coordinate A8 must be used when there is no primary signal and/or no ignition spark available.



If detailed instructions and information are required, always proceed in accordance with the trouble-shooting program as of coordinate C 13.

Test requirement

Battery fully charged, fuel system O.K., engine mechanically O.K. (e.g. compression, valve clearance etc.).

Ambient temperature and temperature of ignition system 0° up to 100°C (temperature greatly affects readings).

Before removing plug connections, the ignition system must be switched off.



## 2. Rapid diagnosis chart

Primary signal and/or ignition spark available

Test step	Possible cause of trouble	Test instructions	Test specifications	Coordinates
1	High-voltage side	Visual examination, continuity test e.g. of ignition harness, distributor cap etc. Ignition oscillogram.	---	C 15
2	Ignition coil	Visual examination, plug present, sealing compound escaped? Electrical test primary term. 1 and term. 15 secondary term. 1 and term. 4	0.7 ... 1.2 $\Omega$ 6.9 ... 11.9 k $\Omega$	C 15
3*	Ignition distributor, mounting pos.	Engine cyl. 1 at TDC, distributor rotor center points to housing marking.	---	C 17
	Contact resistances	Check voltage-supply lines of trigger box and ignition coil for contact resistance.	max. 0.3 $\Omega$	C 19
4	Indicator lamp	Ignition ON. Ignition lamp lights Engine at idle. Ignition lamp goes out	---	C 21
5	t <sub>i</sub> signal (without engine load)	Run engine at normal operating temperature at approx. 3500 min <sup>-1</sup> (approx. 5s). Indicator lamp flashes. Afterwards, engine at idle (approx. 5s). Indicator lamp goes out.	---	D 1
6	t <sub>i</sub> signal (with engine load)	Disconnect knock-sensor plug. Remove air filter. Run engine at normal operating temperature at 5000 min <sup>-1</sup> . Hold accelerator pedal in this position, fully open air-flow sensor flap with screwdriver. Indicator lamp flashes above 1000 min <sup>-1</sup> .	---	D 7
7	Knock sensor	Visually examine knock-sensor plug and socket (oxidation, damage).	---	D 9
8	Knock-control device	Engine at idle. Voltage measurement, knock-control device plug term. 14 (+) and term. 8 (-).	9V ... U <sub>B</sub>	D 10
9	Knock-sensor monitoring	Knock sensor connected. Apply knock-control device plug term. 5 to vehicle ground. Run engine at > 3500 min <sup>-1</sup> . Indicator lamp does not light.	---	D 12
10	Evaluation circuit	Knock sensor connected. Apply knock-control device plug term. 5 to vehicle ground. Run engine at 500...1600 min <sup>-1</sup> . Indicator lamp does not light.	---	D 14

\* Only perform when engine not running.

**A4**Rapid diagnosis chart  
Peugeot**A5**Rapid diagnosis chart  
Peugeot



Rapid diagnosis chart (continued)      Primary signal and/or ignition spark available

Test step	Possible cause of trouble	Test instructions	Test specifications	Coordinates
11	Change-over relay	Apply electrical pressure-switch connection to vehicle ground. Switch ignition on and off. Switching of change-over relay must be detectable audibly or by feeling.	---	D 16
12	Part-load ignition advance	Apply electrical pressure-switch connection to vehicle ground. Briefly run engine (normal operating temperature) in full-load range (vehicle-performance tester, road). Indicator lamp flashes.	---	D 18
13	Ignition basic setting	Electrical pressure-switch connection applied to vehicle ground. Check ignition point.	44° before TDC at 4000 ± 50 min <sup>-1</sup>	D 20
14	Pressure switch	Visual examination, check pressure line for damage. Electrical test    Pressure < approx. 80 mbar (switch closed) Pressure > approx. 120 mbar (switch open)	Approx. 0 Ω ∞ Ω	D 22
15	Voltage supply, trigger box	Engine at idle. Voltage measurement, trigger-box plug term. 4 (+) and term. 2 (-).	12 ... 14 V, max. 1 V below U <sub>B</sub>	E 1
16	Voltage supply, ignition coil	Engine at idle. Voltage measurement at ignition coil term. 15 and negative battery terminal.	min. 10 V	E 1
17	Primary voltage	Engine at idle. Primary voltage at ignition coil term. 15 and term. 1	290 ... 400 V	E 3

**A6**

Rapid diagnosis chart

Peugeot



**A7**

Rapid diagnosis chart

Peugeot



Test step	Possible cause of trouble	Test instructions	Test specifications	Coordinates
1	Ignition-distributor plug	Visually examine ignition-distributor plug and socket (oxidation, damage).	---	F 1
2	Ignition relay	Ignition ON. Voltage measurement, trigger-box plug term. 4 (+) and vehicle ground.	Approx. $U_B$	F 3
3	Magnetic pulse generator	1. Ignition ON. Voltage measurement, ignition-distributor plug term. 8h (+) and term. 3ld (-). 2. Start engine. Test signal at ignition-distributor plug term. 7 and vehicle ground.	min. 10 V Rectangular pulse	F 7
4	Spark-advance mechanism	Start engine. Test signal at spark-advance mechanism plug term. 7 and vehicle ground.	Rectangular pulse	F 11
5	Knock-control device	Start engine. Test signal at knock-control device plug term. 13 and vehicle ground.	Rectangular pulse	F 13
6	Trigger-box control lead	Start engine. Test signal at trigger-box plug term. 5 or 6 and vehicle ground.	Rectangular pulse	F 17
7	Ground, trigger box	Ignition ON. Voltage measurement, trigger-box plug term. 4 (+) and term. 2 (-).	Approx. $U_B$	F 19
8	Primary circuit	Ignition ON. Voltage measurement, trigger-box plug term. 1 (+) and term. 2 (-).	Approx. $U_B$	F 19
9	Ignition coil	Visual examination, plug present, sealing compound escaped? Electrical test primary term. 1 and term. 15 secondary term. 1 and term. 4	0.7 ... 1.2 s. 6.9 ... 11.9 $\Omega$	F 21



### 3. Test specifications

Ignition coil, primary	0.7...1.2 $\Omega$
Ignition coil, secondary	6.9...11.9 k $\Omega$

**C15**

Knock control unit power supply	9 V ... $U_B$
------------------------------------	---------------

**D10**

Knock sensor	270 ... 330 k $\Omega$
Knock sensor tightening torque	11 ... 15 Nm

**D12**

Basic ignition setting at 4000 min <sup>-1</sup>	44° BTDC
---	----------

**C21**

Pressure switch	< 80 mbar approx. 0 $\Omega$
	> 120 mbar $\infty \Omega$

**D22**

Trigger box power supply	12 ... 14 V
-----------------------------	-------------

**E1**

Ignition coil power supply	$\geq 10$ V
-------------------------------	-------------

**A10**

Test specifications

Peugeot



## Test specifications (continued)

Primary voltage with engine  
idling

290 ... 400 V

**E3**

Ignition pulse generator  
power supply  
with ignition on

$\geq 10$  V

**F7**

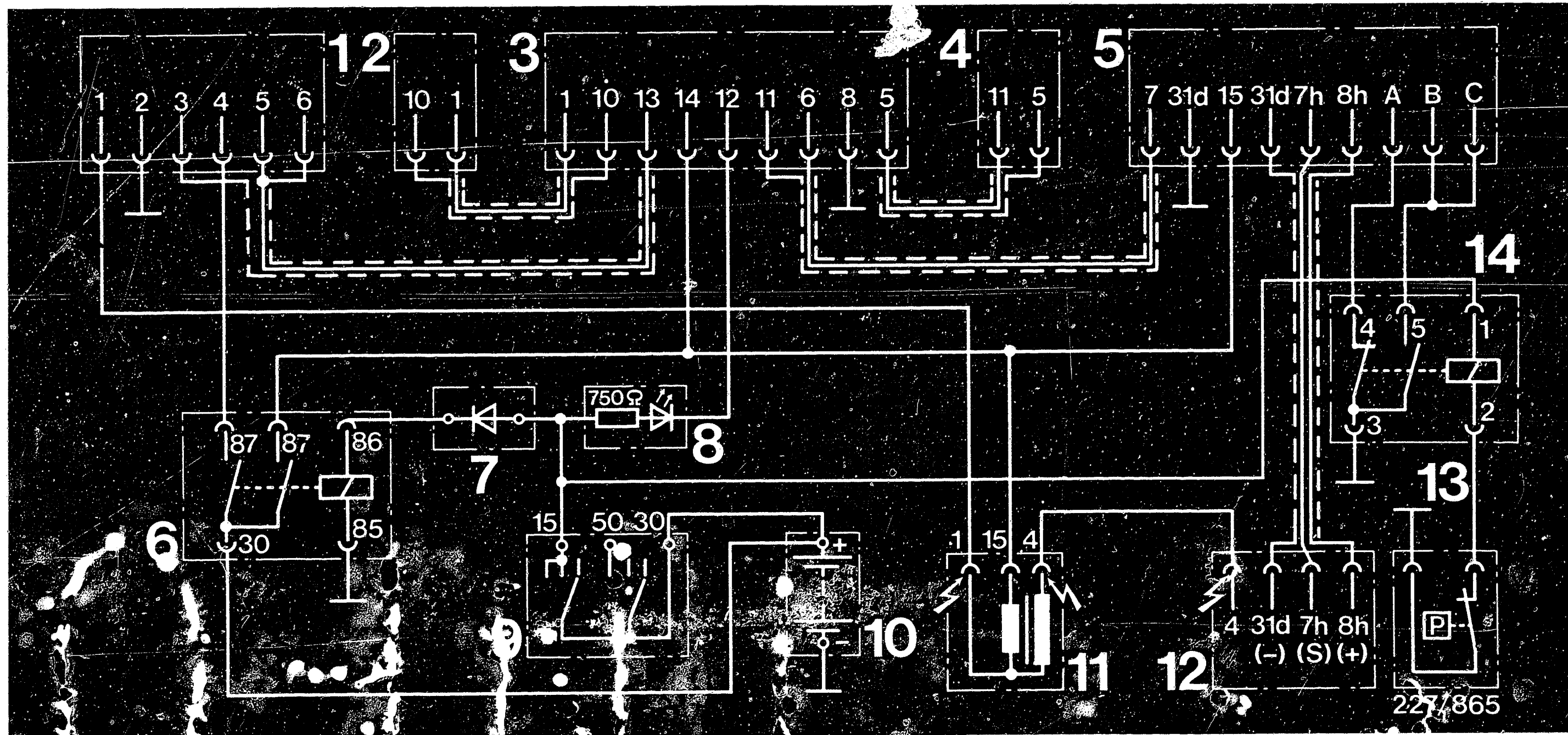
See Autodata test specifications for settings for  
ignition, idle speed, exhaust gas, valve clearance etc..

**A11**

Test specifications

Peugeot





High-voltage arrows = Danger, 400 V ... 25 kV

- 1 = Trigger box
- 2 = Knock sensor
- 3 = Knock control unit
- 4 = L-Jetronic control unit
- 5 = Timing-advance unit
- 6 = Ignition relay
- 7 = Incorrect-polarity protection diode

- 8 = Indicator lamp
- 9 = Ignition/starting switch
- 10 = Battery
- 11 = Ignition coil
- 12 = Ignition distributor
- 13 = Pressure switch
- 14 = Change-over relay for part-load ignition advance

4. Electrical terminal diagram

**A12**

Electrical terminal diagram

Peugeot

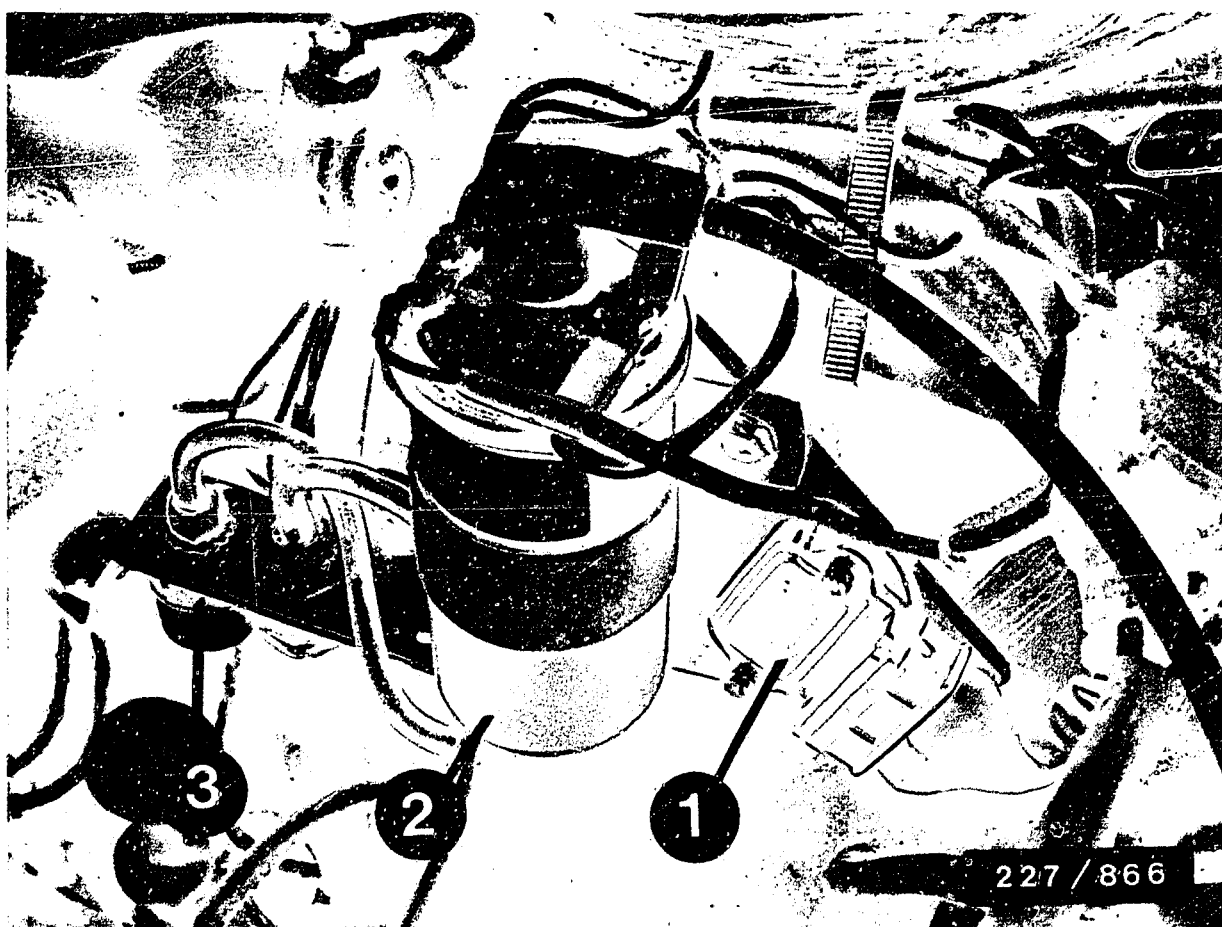


**A13**

Electrical terminal diagram

Peugeot



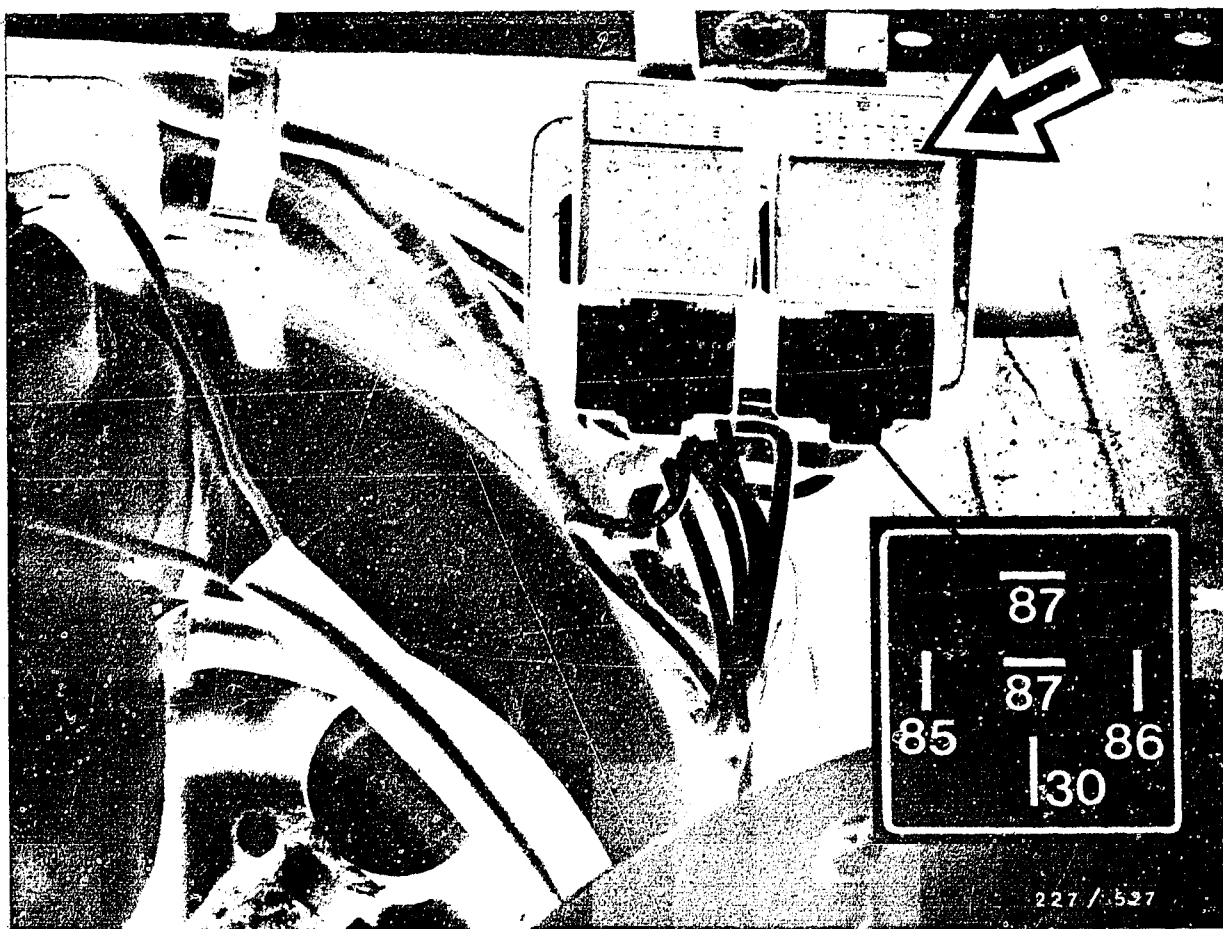


- 1 = Trigger box with heat sink
- 2 = Ignition coil
- 3 = Pressure switch for part-load ignition advance

#### 5. Installation position of components

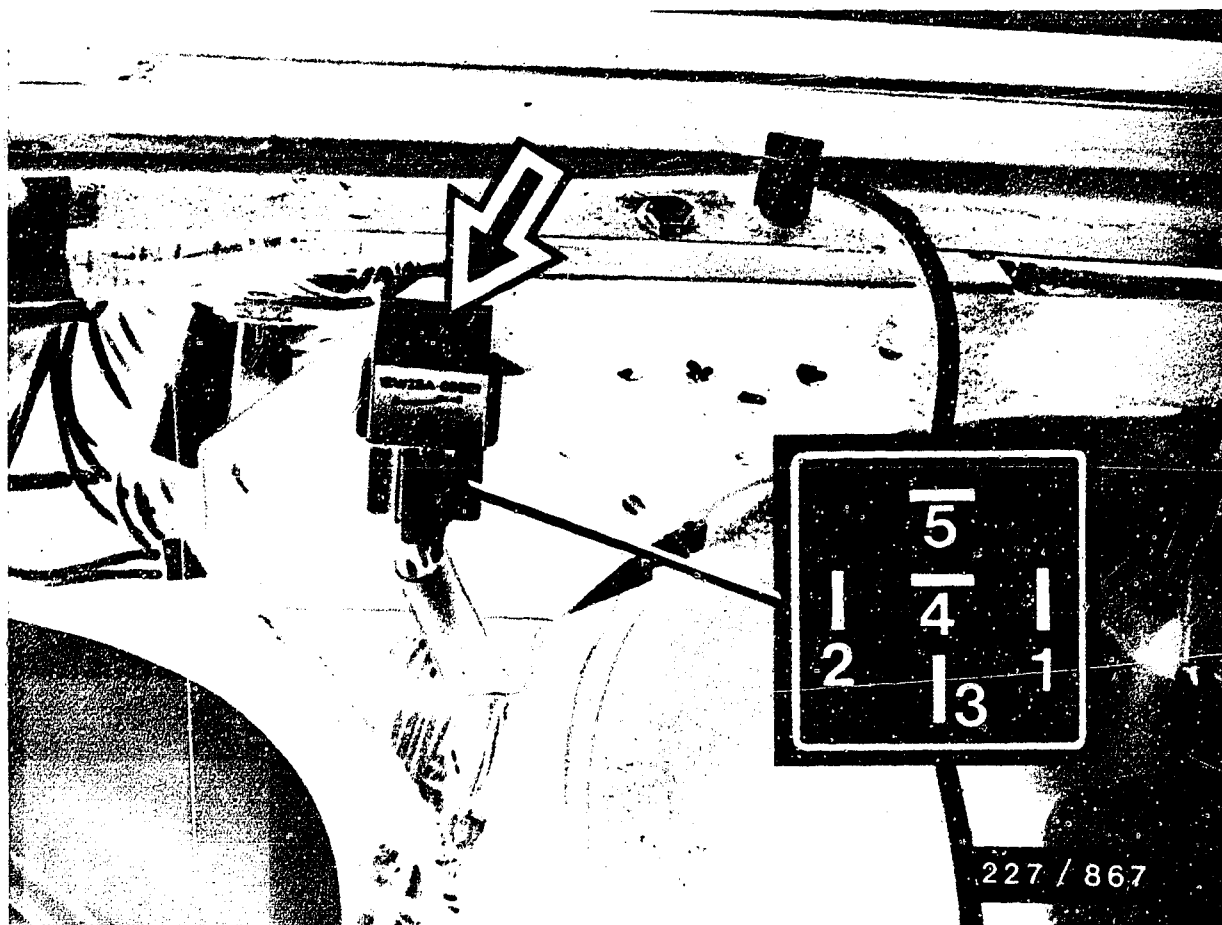
The trigger box, ignition coil and pressure switch are positioned in the engine compartment on the left (with reference to forward direction of travel).





Arrow = Ignition relay





Arrow = Change-over relay for part-load ignition advance

Detail: View of relay plug





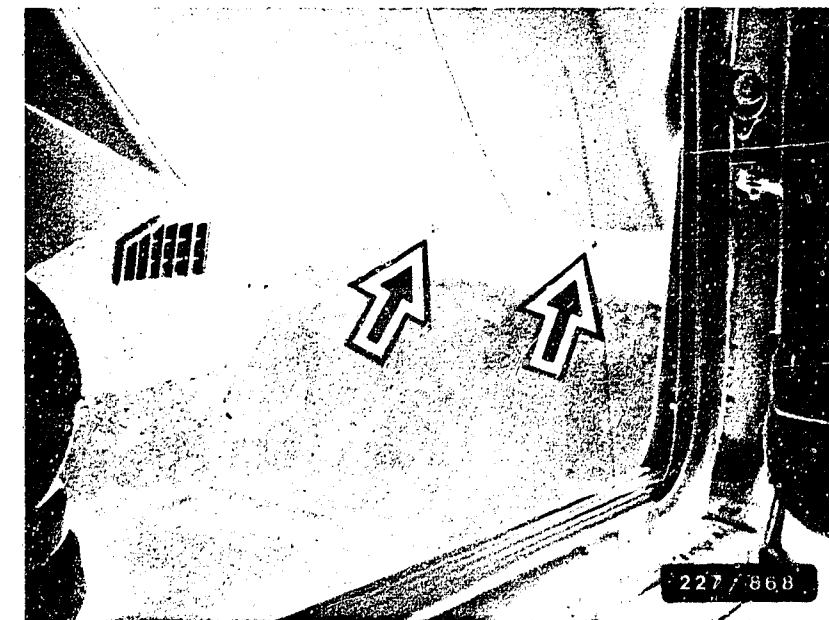
Spark-advance mechanism and the knock-control device are positioned in the passenger's footwell behind a cover.

Note on removal:

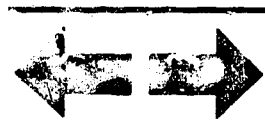
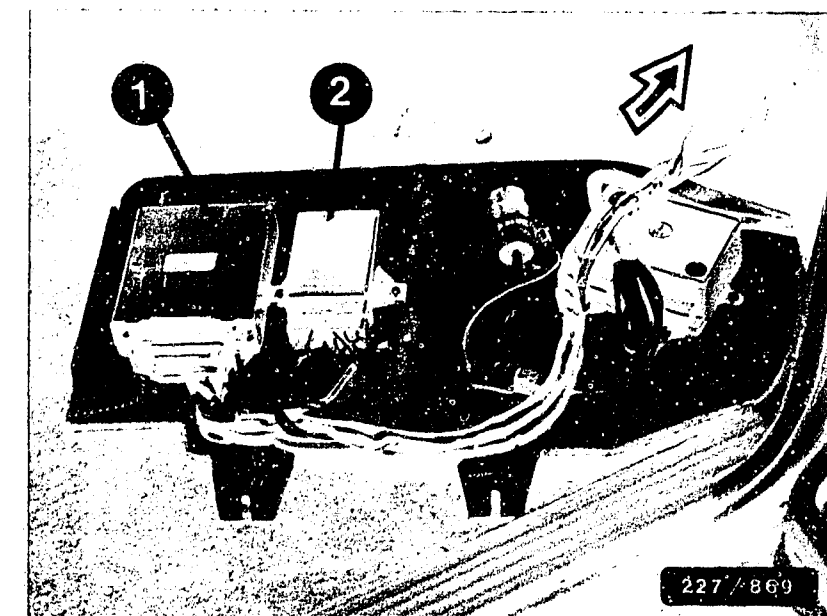
Loosen the two nuts at the upper edge of the cover and remove the cover, see arrows, upper illustration.

The L-Jetronic control unit is positioned behind the glove compartment, see arrow, lower illustration.

To disconnect the L-Jetronic control-unit plug, it must be removed from a cover plate in the footwell (loosen 2 screws).



- 1 = Knock-control device
- 2 = Spark-advance mechanism



The indicator lamp (1) including protective resistor are in the instrument panel (top picture).

### How to remove

Remove the steering wheel (wheels straight ahead).

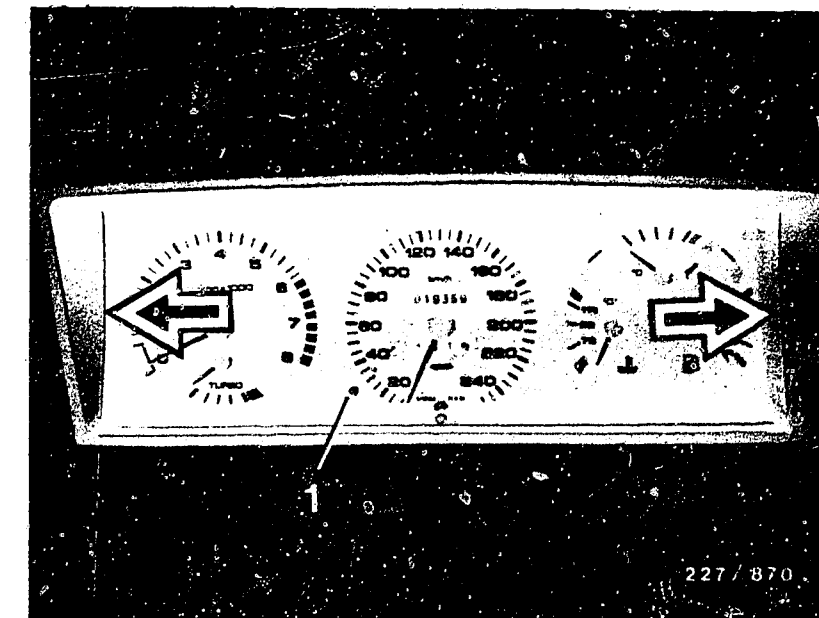
Introduce a thin screwdriver into the two instrument panel holes one after the other (see upper illustration, arrows).

The instrument panel is released by pressing lightly with the screwdriver.

Remove the instrument panel from its installation recess (speedometer shaft has latch-type connection).

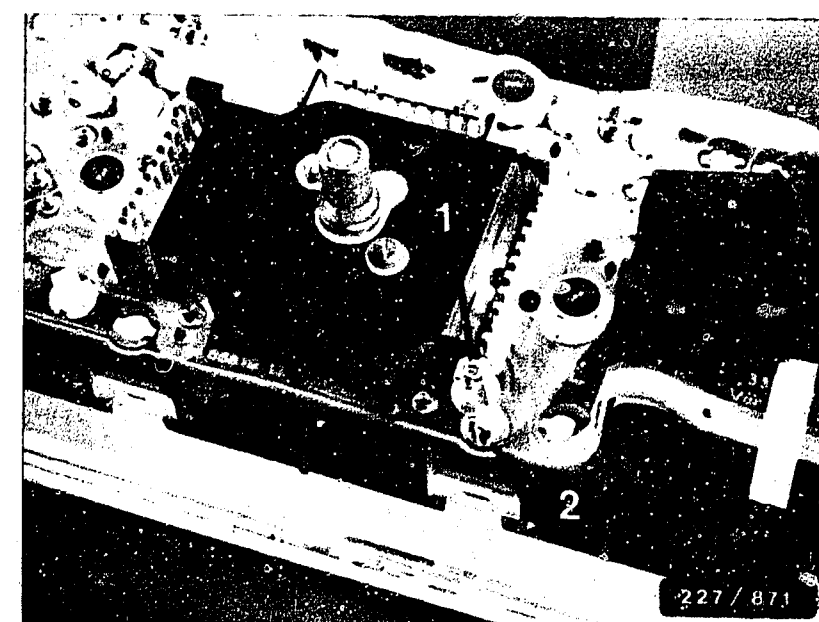
Remove fitting of indicator lamp (see lower illustration).

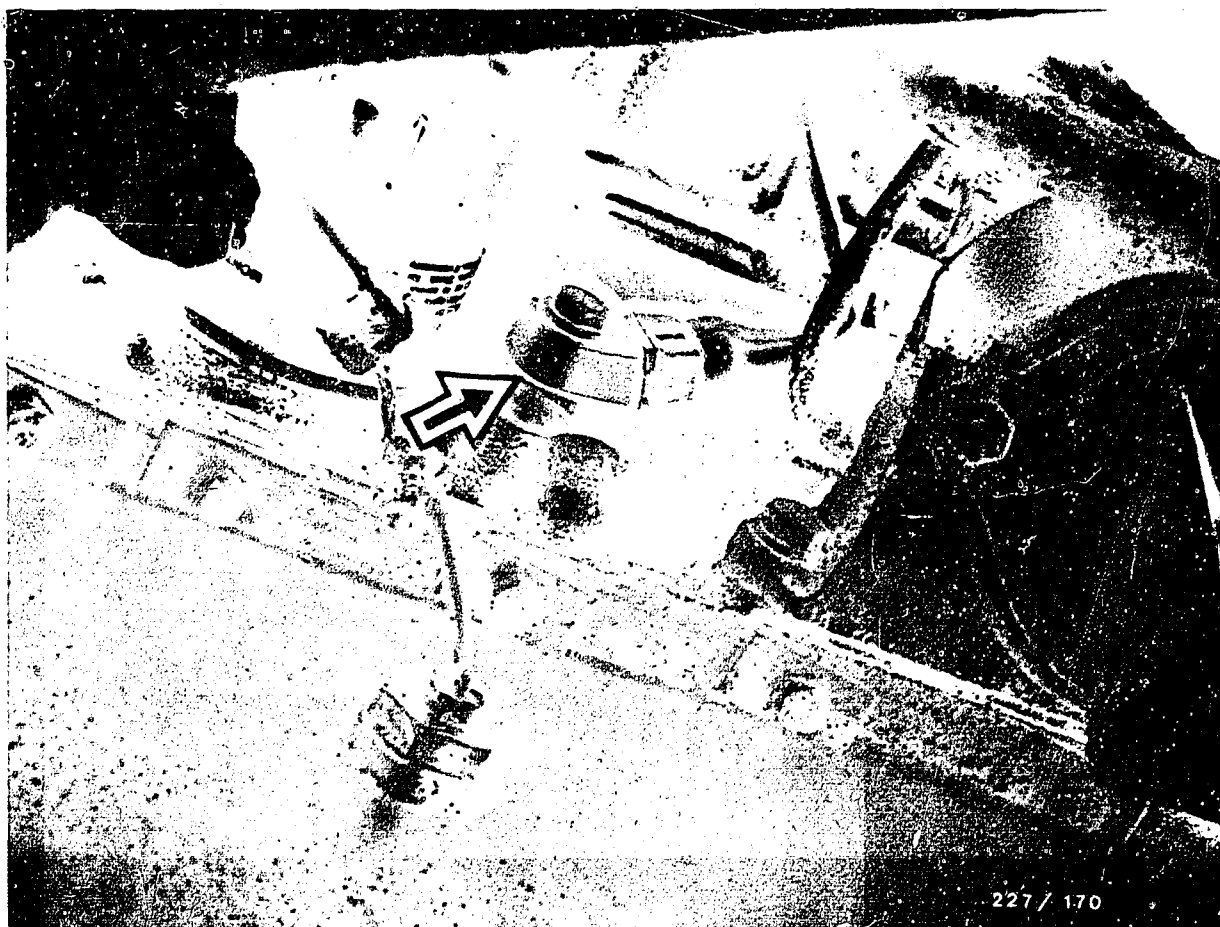
Installation of indicator lamp: identified by a large bulge on the lower part of the plate for implementing protective resistance (see lower illustration).



1 = Indicator lamp

1 = Indicator-lamp fitting  
2 = Protective resistor





1 = Knock sensor

The knock sensor is on the engine block (near oil filter) on the left-hand side in the forward direction of travel.

Notes:

Note the installation position of the knock sensor (connection horizontal). See picture.

Install knock sensor fastening screw without plain washer, spring lock washer, tooth lock washer etc.

Tightening torque 11 ... 15 Nm

Secure fastening screw only with locking paint.



## 6. Necessary test equipment, aids

Motortester e.g.	MOT 201	0 684 000 201
Pulse shaper (is required for measurement of primary voltage with MOT 201, 202 and 400).		1 684 463 154
Spark gap e.g. Ignition coil - capacitor tester or Single spark gap	EFAW 106 A EF 1177/7	0 691 100 001 1 684 531 000
Sleeve-type suppressor 5 k $\Omega$		0 356 500 001
Dwell-angle tester	KTE 001.03 MOT 100 MOT 101 MOT 102 MOT 104 MOT 200 MOT 201 MOT 300	0 684 400 103 0 684 000 100 0 684 000 101 0 684 000 102 0 684 000 104 0 684 000 200 0 684 000 201 0 684 000 300
Ohmmeter or e.g.	ETE 014.00 Pontavi Wh2	0 684 101 400 commercially available
Voltmeter e.g.	MOT 201	0 684 000 201
Thermal conduction compound		5 942 860 003
Screw locking paint	30 g	5 703 245 003
Torque wrench, range 5 ... 60 Nm		Commercially available



## Necessary test equipment, aids (continued)

Test prods, red	1 684 485 035
black	1 684 485 034
(for expert connection of testers to connection plugs)	

Test leads	KDZS 0004, 0005
(for expert connection of testers to connection plugs)	

### Note:

The following devices listed are frequently already available in the diesel workshop and are used for testing the manifold-pressure compensators on diesel fuel-injection pumps.

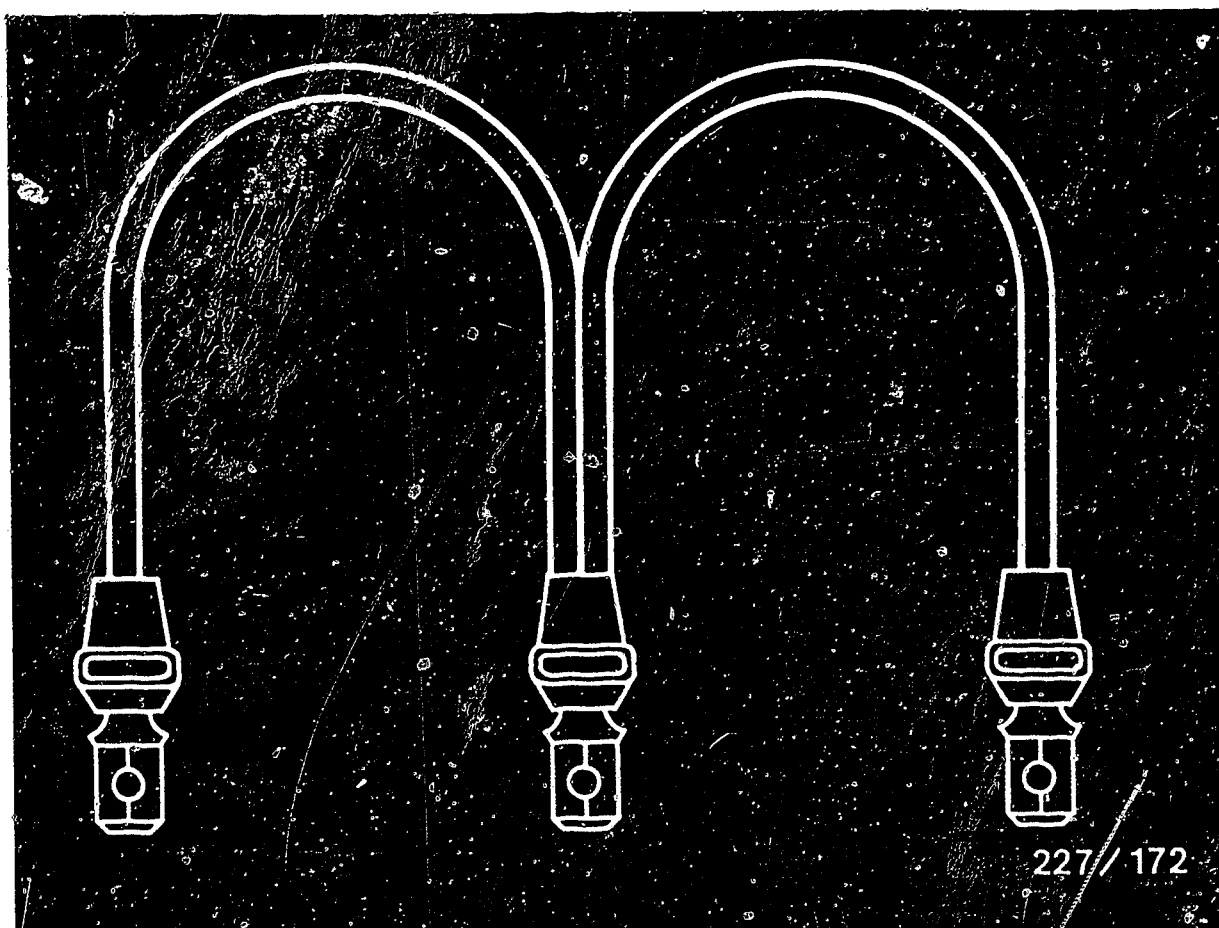
Pressure-reducing valve for compressed air with pressure gauge 0 ... 4 bar	Commercially available
--	------------------------

Pressure gauge 0 ... 1.6 bar, quality class 1.0. Scale 0.05 (e.g. Wika Type 211.160.6 - Part No. 4184)	Commercially available
--	------------------------

Adjusting restriction	1 688 130 132
-----------------------	---------------

or Pressure-vacuum pump, Mityvac-Duo from Korinth Ludwig-Kloos-Straße 21 D-6450 Hanau 7 - Steinheim	Commercially available
--	------------------------





Auxiliary lead to be user-fabricated

The auxiliary lead is required for bridging the power-supply relay (ignition).

Necessary parts: approx. 150 mm cable 2.5 mm<sup>2</sup>  
3 blade terminals 8 784 480 011



## 7. Danger of accident on electronic ignition systems

Increased demands of modern engines on the ignition system combined with the desire for freedom of maintenance have recently led to electronic ignition systems being fitted as standard. Usually the ignition power of electronic systems (of almost all manufacturers) is higher than that of conventional systems, and there are signs of further increases in power. Electronic ignition systems thus reach a power range which can be highly dangerous if live parts or terminals are touched (both on the primary as well as the secondary sides).

In this connection we should like to point out that the VDE regulations, in particular VDE 0104/7.67 and/or the respective national regulations must be followed when testing or working on the ignition system.

The ignition should always be switched off when working on the ignition system (switch off ignition or voltage source). Such work includes:

- Connecting of engine test equipment (timing light, dwell-tach tester, ignition oscilloscope etc.).
- Replacing parts of the ignition system (spark plug, ignition coil, ignition distributor, H.T. ignition cable etc.).

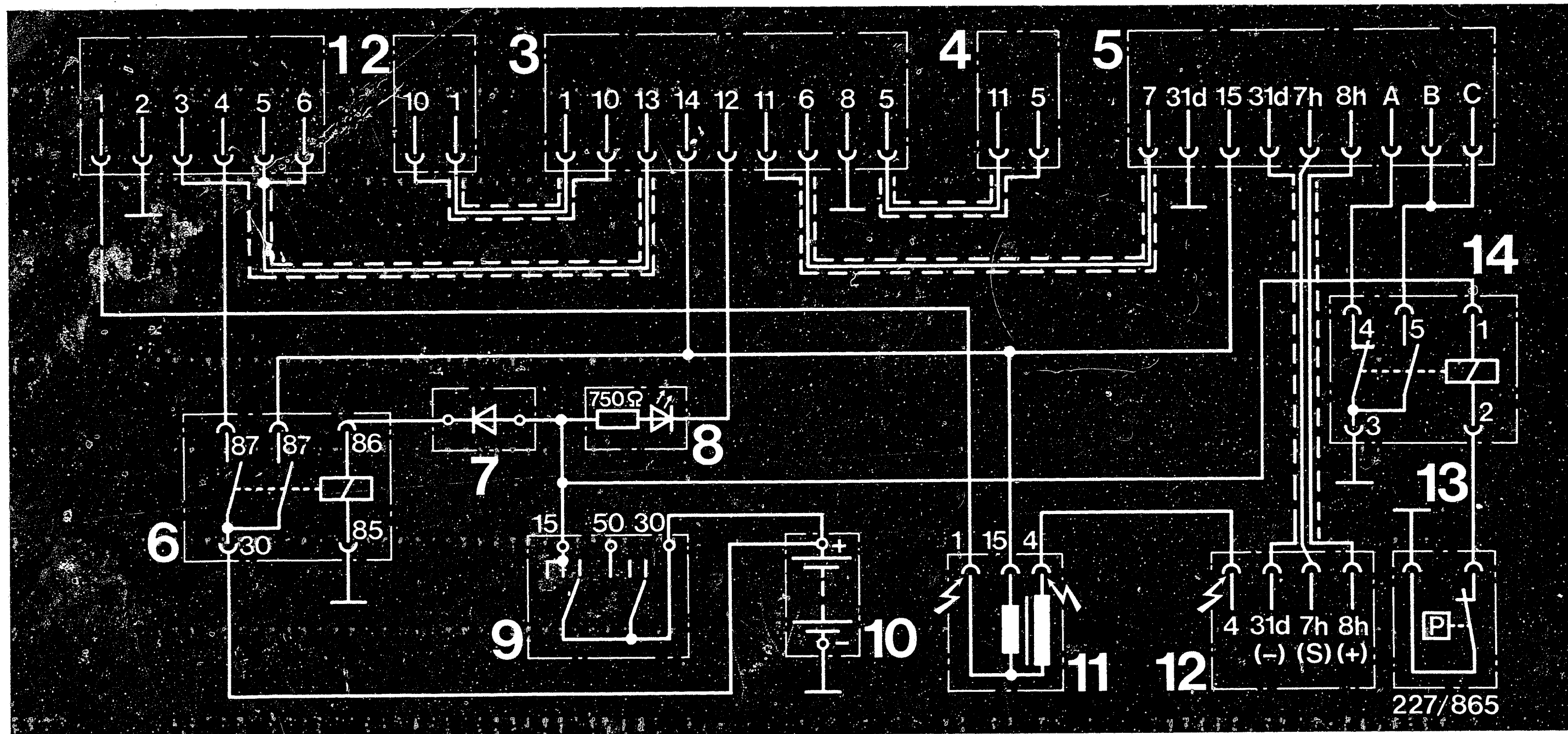


If, while testing the ignition system or during adjustment work on the engine (e.g. L-Jetronic) it becomes necessary to switch on the ignition (switch on the ignition or voltage source); the above-mentioned dangerous voltages occur over the entire system.

The danger of accident exists, therefore, not only on the individual assemblies of the ignition system (e.g. ignition distributor, ignition coil, trigger box, ignition harness), but also on the wiring harness (e.g. tachometer connection, diagnostic plug), at plug-in connections and test equipment.







High-voltage arrows = Danger, 400 V ... 25 kV

- 1 = Trigger box
- 2 = Knock sensor
- 3 = Knock control unit
- 4 = L-Jetronic control unit
- 5 = Timing-advance unit
- 6 = Ignition relay
- 7 = Incorrect-polarity protection diode

- 8 = Indicator lamp
- 9 = Ignition/starting switch
- 10 = Battery
- 11 = Ignition coil
- 12 = Ignition distributor
- 13 = Pressure switch
- 14 = Change-over relay for part-load ignition advance

#### Electrical terminal diagram

The dangerous locations are marked with danger arrows taking the example of the terminal diagram of an electronic system.

**B3**

Danger of accident  
Peugeot



**B4**

Danger of accident  
Peugeot



8. Incorrect indication of engine speed, dwell angle and ignition point

In ignition systems with trigger box 0 227 100 123 (TZ-I) with current limitation there may be an incorrect indication of engine speed, dwell angle and ignition point on testers.

For further information see Coordinates N 8 - N 13.



## 9. Important vehicle information

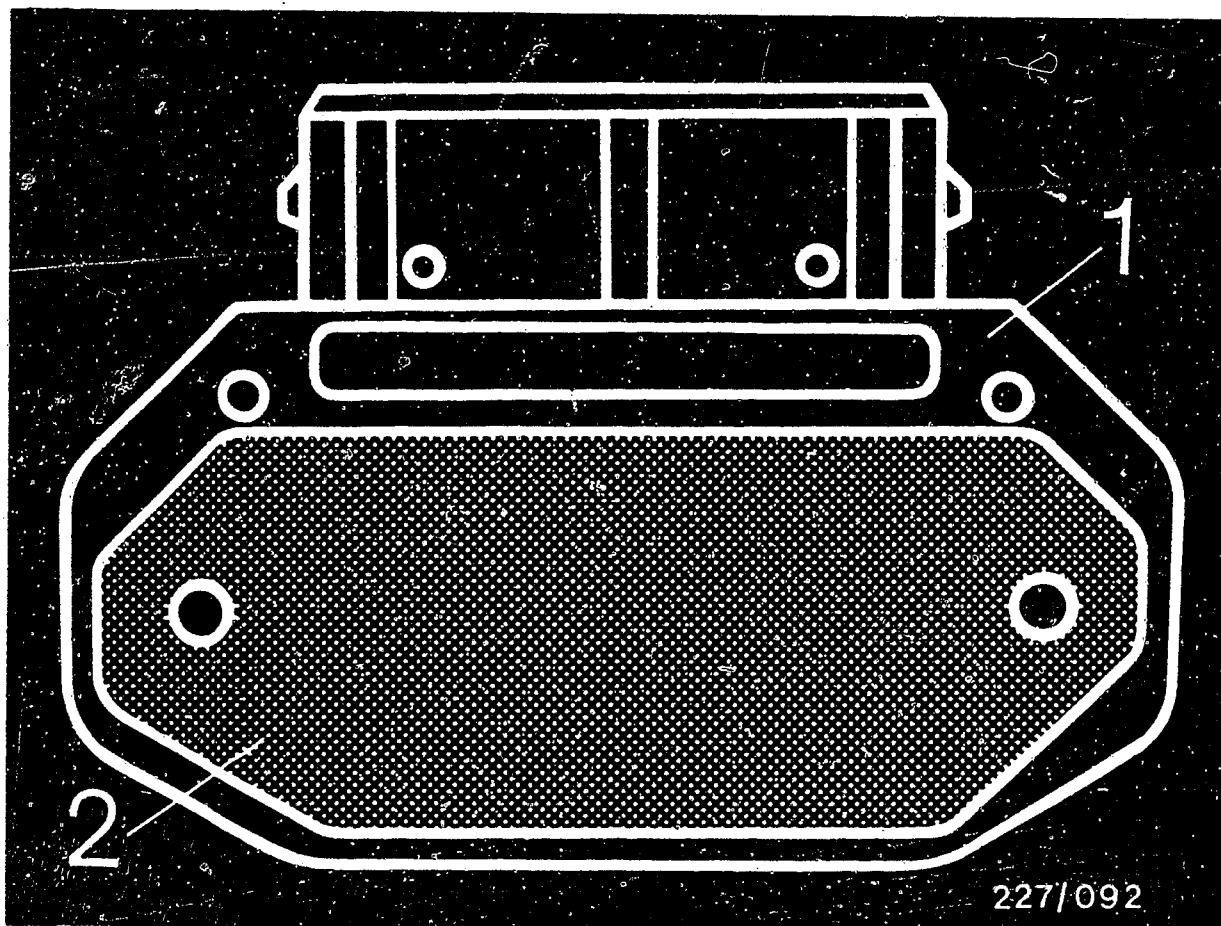
- Resistance measurements must only be performed with the ignition switched off or with the battery disconnected (measuring instrument defective).
- During the compression test, either pull off the trigger-box plug or firmly connect terminal 4 of the ignition coil to ground using an extra cable (dangerous voltages, insulation damage at ignition coil, ignition distributor, ignition harness).

### Note:

The extra cable must be suppressed with at least 2 k $\Omega$ , e.g. with sleeve-type suppressor (5 k $\Omega$ ) 0 356 500 001.

- The specified ignition coil (see Part No.) must not be replaced with a different ignition coil.
- No suppression capacitor may be connected to ignition coil term. 1.
- Ignition coil terminal 1 must not be brought into contact with ground as a theft-proofing measure (ignition coil will be destroyed when ignition is switched on).
- No battery + and no test lamp may be connected to ignition coil terminal 1 (trigger box will be destroyed).
- Ignition cable from ignition coil terminal 4 to ignition distributor terminal 4 must not be disconnected during operation.
- There must be no arcing from ignition coil terminal 4 to ignition coil terminal 1 and 15.  
Ignition pulse generator and trigger box may be destroyed.

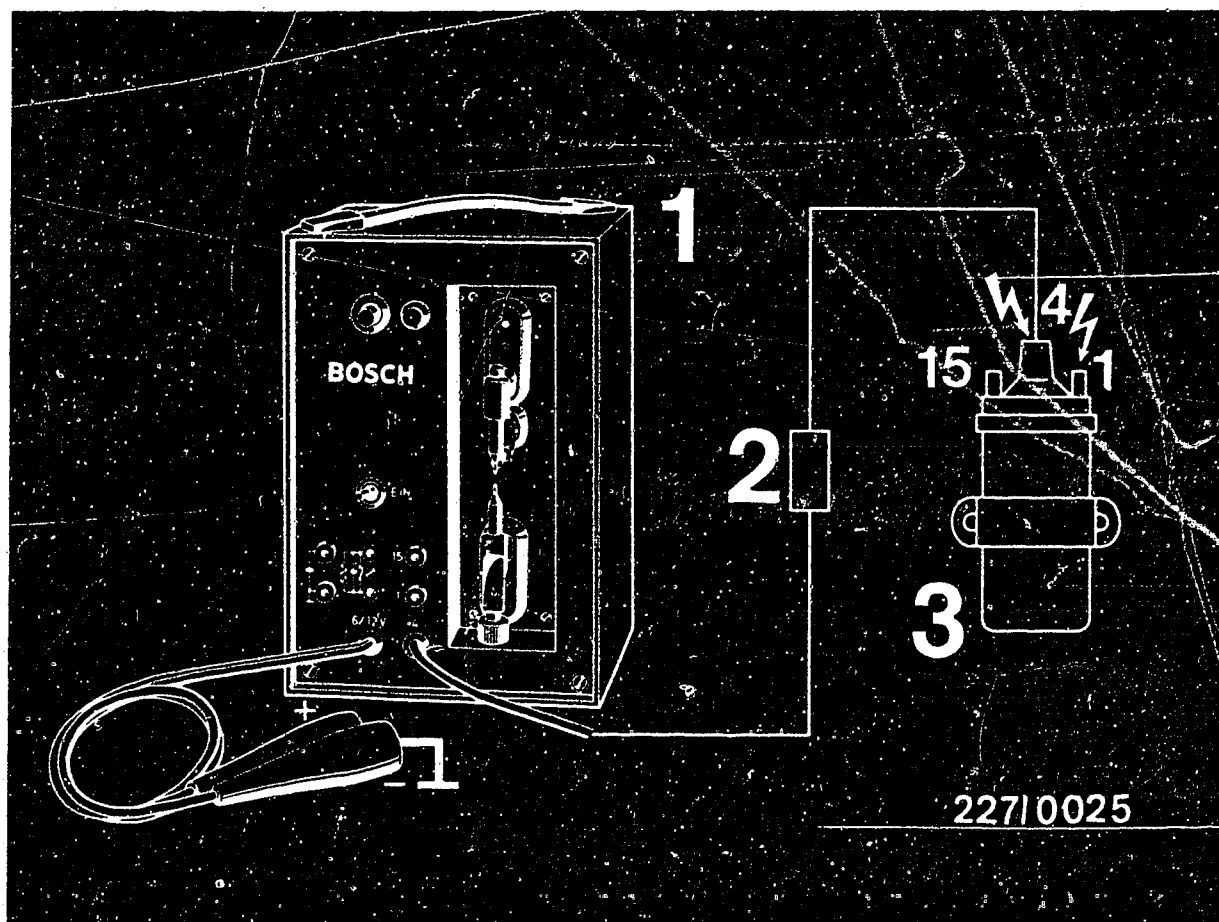




1 = Trigger box

2 = Base plate

- Before mounting the trigger box, the base plate must be coated with thermal conduction paste. Apply thermal conduction paste only with a suitable object (screwdriver, matchstick etc.). Do not apply thermal conduction paste to painted parts.



- 1 = Spark gap
- 2 = 5 kΩ sleeve-type suppressor
- 3 = Ignition coil

High-voltage arrows: Danger, 400 V ... 25 kV

- In order to prevent the trigger box from being irreparably damaged, when using a spark gap, an interference-suppression resistor of at least 2 kΩ must be connected between the spark gap and ignition coil terminal 4, e.g. sleeve-type suppressor (5 kΩ) 0 356 500 001.

**B8**

Important vehicle information

Peugeot



- In order to prevent the trigger box from being irreparably damaged, the secondary side of the ignition system must have at least 2 k $\Omega$  interference suppression whereby the original distributor rotor with 1 k $\Omega$  interference-suppression resistor must be fitted (even in the case of radio and spark interference suppression do not use a 5 k $\Omega$  distributor rotor).
- No external voltage, e.g. ohmmeter, may be connected to ignition pulse generator (Hall generator).  
Caution when changing measuring ranges.
- Leads between ignition pulse generator and timing-advance unit and between timing-advance unit and trigger box must be shielded (malfunction of timing-advance unit and trigger box).
- The holding springs of the distributor cap must not drop into the pickup system when the engine is being cranked and with the dust-protection cover removed.
- Arcing or breakdown of insulation at the distributor cap may lead to the destruction of ignition pulse generator and trigger box.
- Do not disconnect the battery with the engine running.
- Do not use a starting aid with more than 16 V or a fast charger for starting.



- The knock sensor lead must be screened and laid separately from high-tension cables.
- Install the knock sensor fastening screw without plain washer, spring lock washer, tooth lock washer etc. Secure the fastening screw only with locking paint.



## 10. Trouble-shooting

### 10.1 Procedure for trouble-shooting chart

The trouble-shooting chart starting on Coordinate C3 is divided into the following sections:

"Trouble-shooting for ignition" and "Trouble-shooting for knock control".

The chart contains symptoms of the trouble, cause of the trouble, test instructions and coordinate references. Select the possible cause of the trouble in the trouble-shooting chart in accordance with the customer complaint (symptom of trouble).

If the cause of the trouble is unclear, start testing with the detailed, self-contained trouble-shooting program starting on Coordinate C13.

If the cause of the trouble has been clearly diagnosed in accordance with the trouble-shooting chart, then direct trouble-shooting is possible by going to the coordinate given on the right without having to go through the entire trouble-shooting program for each fault. If there is no coordinate given on the right, carry out trouble-shooting in accordance with the "test instructions" column.

### 10.2 Procedure for trouble-shooting program

The trouble-shooting program starting on Coordinate C 13 is divided into 3 rows of boxes.

The left-hand row contains test instructions and test specifications.

The center row contains repair instructions.

The right-hand row contains the illustrations/terminal diagrams belonging to the text and the explanation of the items in the picture.

If the questions asked in the left-hand row can be answered conclusively with "yes", then proceed to the next test down.

If the answer to the question is "no", branch to the center row and carry out the tests given there.

### 10.3 Test conditions

Battery fully charged, fuel system O.K., engine mechanically O.K. (e.g. compression, valve clearance etc). Ambient temperature/ignition system temperature 0° to 100 °C (temperature has a considerable effect on measured values).

**C1**

Trouble-shooting

Peugeot



**C2**

Trouble-shooting

Peugeot





# 10.4 Trouble-shooting chart for ignition (with ignition coil, ignition distributor, trigger box and ignition timing unit)

(Customer complaint (symptom of trouble))

1. Starting motor operates, but engine fails to start

2. Rough idling

3. Poor throttle response

4. Engine lacks power

5. Misfiring

6. Fuel consumption too high

7. Engine pings when accelerating

8. Backfiring.

9. Engine overheats

									Cause of trouble	Test instructions	Coordinate
●	●	●	●	●	●	●	●	●	Unclear	Carry out detailed trouble-shooting	C 13
●	●	●	●	●	●		●		Spark plugs defective	Assess using ignition oscillogram or remove spark plug and make visual examination.	----
●	●	●	●	●	●	●	●	●	Basic ignition setting incorrect	To prevent incorrect adjustment, be sure to test in accordance with instructions.	C 21 - D 21
●	●	●	●	●					Shunt on secondary side	Assess ignition coil, ignition distributor, ignition harness and spark plug using ignition oscillogram or make visual examination	----
●	●	●	●	●					Open circuit on secondary side	Assess ignition coil, ignition distributor, ignition harness and spark plug using ignition oscillogram, or test for continuity using ohmmeter	----
●									Open circuit on primary side	-	F 19
●	●	●	●	●					Ignition coil defective	-	C 15

C3

Trouble-shooting chart

Peugeot



C4

Trouble-shooting chart

Peugeot



# Trouble-shooting chart for ignition (continued)

## Customer complaint (symptom of trouble)

1. Starting motor operates, but engine fails to start

2. Rough idling

3. Poor throttle response

4. Engine lacks power

5. Misfiring

6. Fuel consumption too high

7. Engine pings when accelerating

8. Backfiring

9. Engine overheats

Cause of trouble

Test instruction

Coordinate

		●	●	●	●				Interference-suppression resistors defective	Assess using ignition oscillogram or perform resistance measurement	----
		●			●				Part-load ignition advance incorrect	----	D 16
		●	●		●	●		●	Pressure switch defective	----	D 22
●									Timing-advance unit pulse incorrect	----	F 11
				●					Trigger boc defective	----	E 1
●									Ignition distributor pulse generator defective	----	F 9
●									Trigger box control line defective	----	F 17
●									Firing sequence incorrect	1 - 3 - 4 - 2	----
●									Knock control defective	Trouble-shooting for knock control	C 7 - C 12

**C5**

Trouble-shooting chart

Peugeot



**C6**

Trouble-shooting chart

Peugeot



# Trouble-shooting chart for knock control (with indicator lamp, knock sensor, knock control unit and L-Jetronic control unit)

## Customer complaint (symptom of trouble)

1. Starting motor operates but engine fails to start
2. Indicator lamp continuously lit, even after journey with ignition on
3. Indicator lamp not lit before starting with ignition on
4. Indicator lamp flashes only under load
5. Indicator lamp flashes after driving under load even when idling
6. Indicator lamp flickers occasionally only under load
7. Indicator lamp flickers occasionally under load and at idle
8. Engine idle speed unstable
9. Engine knocking, ignition not being retarded

									Cause of trouble	Test instructions	Coordinates
●	●	●	●	●	●	●	●	●	unclear	perform detailed trouble-shooting	C 13
●									Ignition system defective	Trouble-shooting chart f. ignition	C 3- C 6
●		●							Knock control unit defective No power supply to knock control unit	-----	F 13
	●								Knock control unit defective, indicator lamp/connecting lead has short circuit to ground	-----	C 21- C 24
		●							Knock control unit defective, indicator lamp defective, no power supply to indicator lamp	-----	C 21- C 24
			●						Knock sensor connecting lead defective	-----	D 9
			●						Knock control unit voltage < 9 V	-----	D 10
			●						Knock sensor defective or mounting of knock sensor incorrect	-----	D 12
			●						Knock control unit defective	-----	D 14

C7

Trouble-shooting chart

Peugeot



C8

Trouble-shooting chart

Peugeot



# Trouble-shooting chart for knock control (continued)

## Customer complaint (symptom of trouble)

1. Starting motor operates but engine fails to start

2. Indicator lamp continuously lit, even after journey with ignition on

3. Indicator lamp not lit before starting with ignition on

4. Indicator lamp flashes only under load

5. Indicator lamp flashes after driving under load even when idling

6. Indicator lamp flickers occasionally only under load

7. Indicator lamp flickers occasionally under load and at idle

8. Engine idle speed unstable

9. Engine knocking, ignition not being retarded

									Cause of trouble	Test instructions	Coordinate
				●					ti injection signal incorrect	-	D 1 - D 7
				●					Knock control unit voltage < 9 V	-	D 10
				●					Knock sensor defective, knock sensor in- correctly installed	-	D 12
				●					Knock sensor connecting lead defective	-	D 12
				●					Knock control unit defective	-	D 14
					●				Knock sensor connecting lead has loose contact	-	D 12
					●				Knock control unit defective	-	D 14
					●				Ignition overadvanced	-	D 16 - D 21
					●				Engine overheating, engine cooling defective	Check coolant, V-belt, thermostat etc.	----
					●				Charge-air pressure control defective	Test charge-air pressure control	----
					●				Abnormal engine noises leading to detection of knocking	Engine not mechanically O.K. (bearing damage, valve spring broken etc.)	----

**C9**

Trouble-shooting chart

Peugeot



**C10**

Trouble-shooting chart

Peugeot



# Trouble-shooting chart for knock control (continued)

## Customer complaint (symptom of trouble)

1. Starting motor operates but engine fails to start

2. Indicator lamp continuously lit, even after journey with ignition on

3. Indicator lamp not lit before starting with ignition on

4. Indicator lamp flashes only under load

5. Indicator lamp flashes after driving under load even when idling

6. Indicator lamp flickers occasionally only under load

7. Indicator lamp flickers occasionally under load and at idle

8. Engine idle speed unstable

9. Engine knocking, ignition not being retarded

									<u>Cause of trouble</u>	<u>Test instructions</u>	<u>Coordinate</u>
						●			ti injection signal incorrect, knock control unit defective, L-Jetronic control unit defective	-	D 1 - D 7
							●		ti injection signal incorrect	-	D 1 - D 7
								●	ti injection signal incorrect, L-Jetronic control unit defective, knock control unit defective	-	D 1 - D 7



## 10.5 Trouble-shooting program

### Test primary signal.

If no oscilloscope or tachometer is available, check whether there is an ignition spark across the spark gap.

### Primary signal with oscilloscope.

Connect oscilloscope to ignition coil as per operating instructions. Start the engine. Oscilloscope must show a primary voltage (of any value).

### Primary signal with tachometer.

Connect tachometer to ignition coil as per operating instructions. Start the engine. Tachometer must indicate a value (any value).

### Ignition spark with spark gap.

Disconnect ignition cable term. 4 from ignition coil.

Connect spark gap including sleeve-type suppressor (5 k $\Omega$ ) to ignition coil.

Adjust spark gap to 5 mm.

Start the engine.

There must be sparks across the spark gap.

Primary signal present or ignition sparks across spark gap?

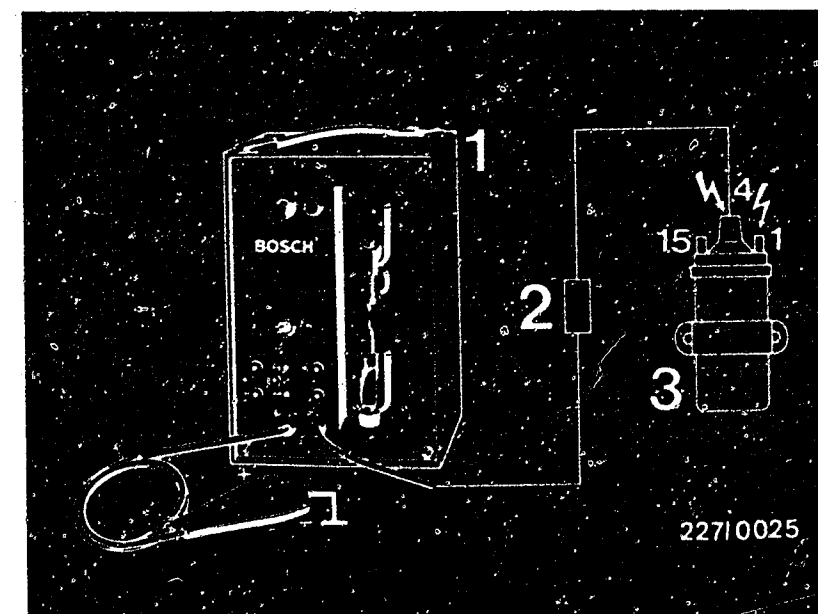
yes

Continued on C15/C16

no

If no primary signal or no ignition spark, continue testing at F1.

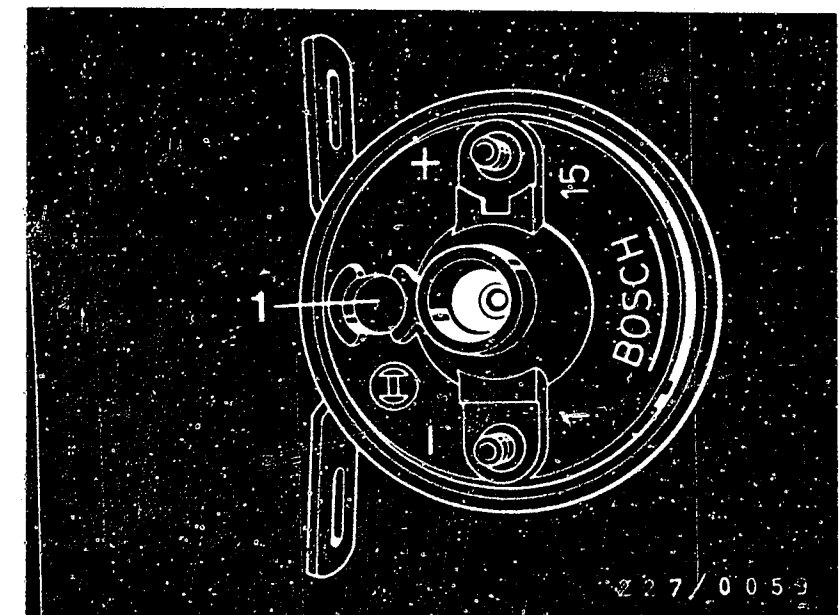
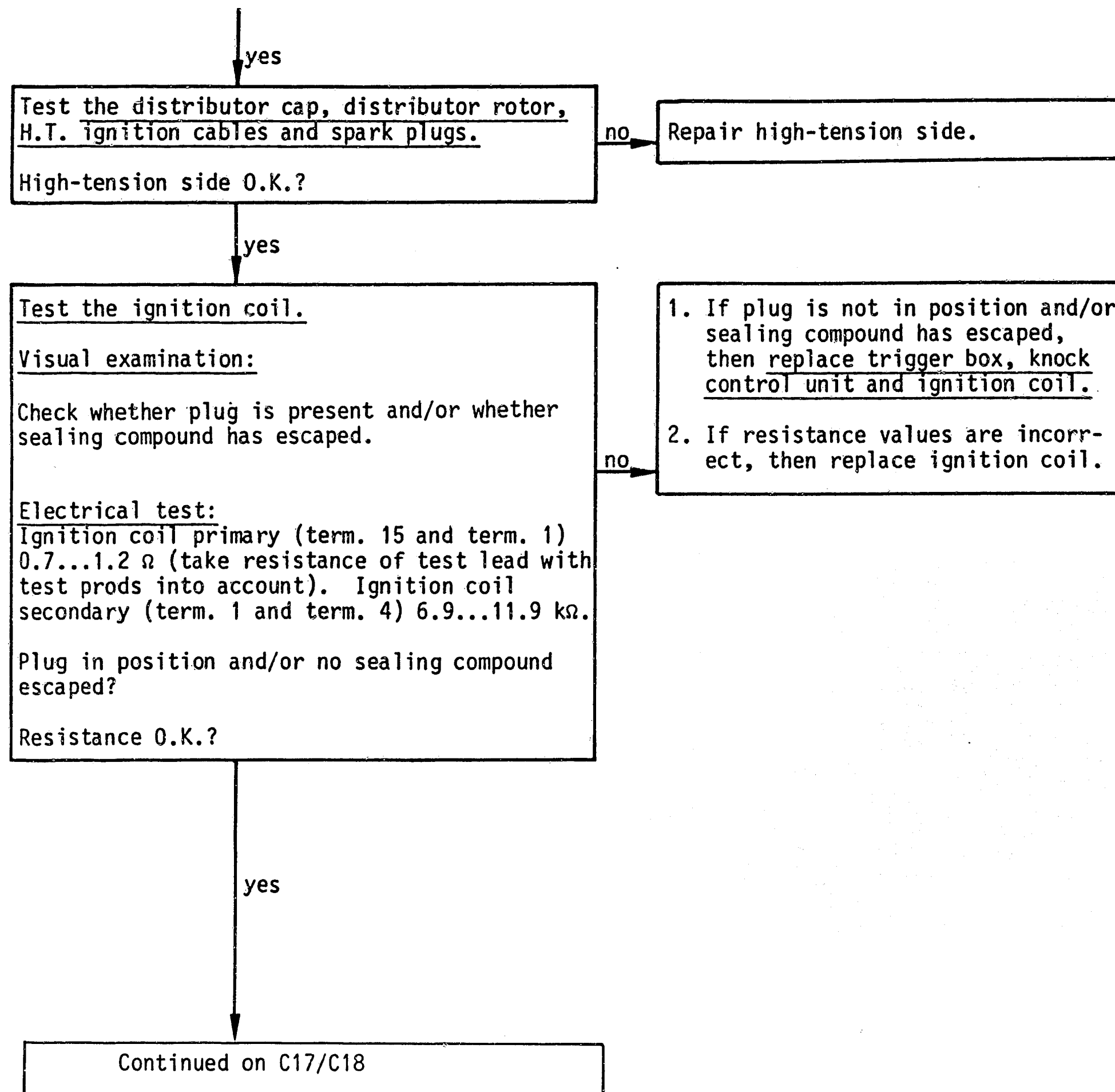
Tests as from C 15 not necessary.



- 1 = Spark gap
- 2 = 5 k $\Omega$  sleeve-type suppressor
- 3 = Ignition coil

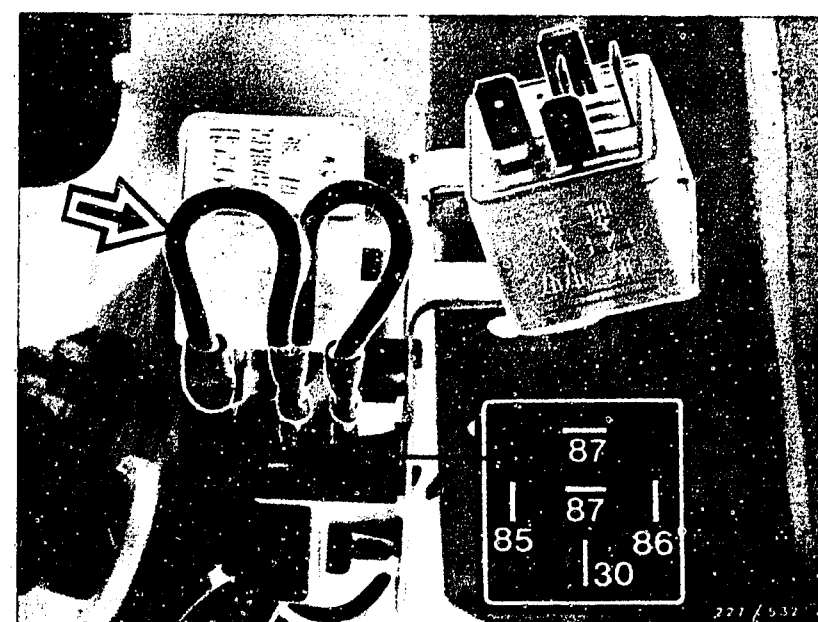
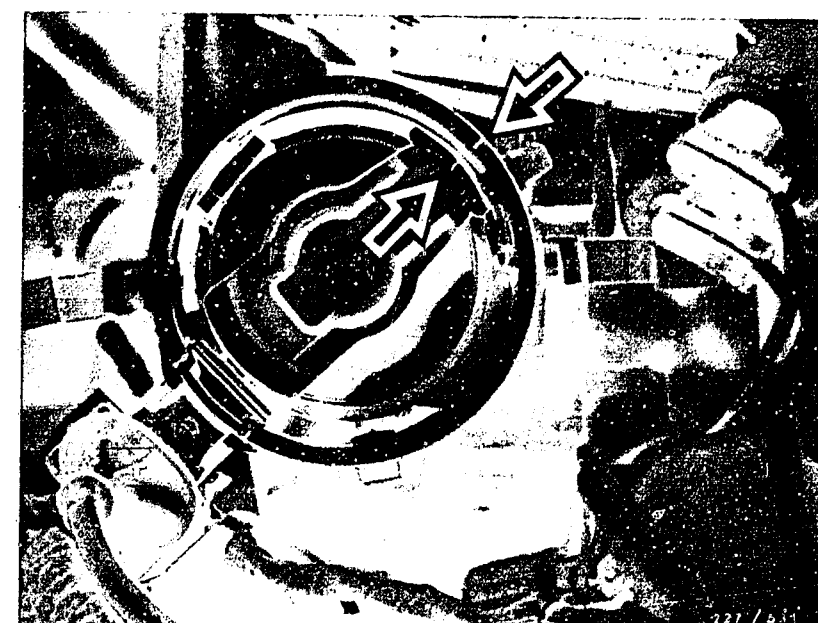
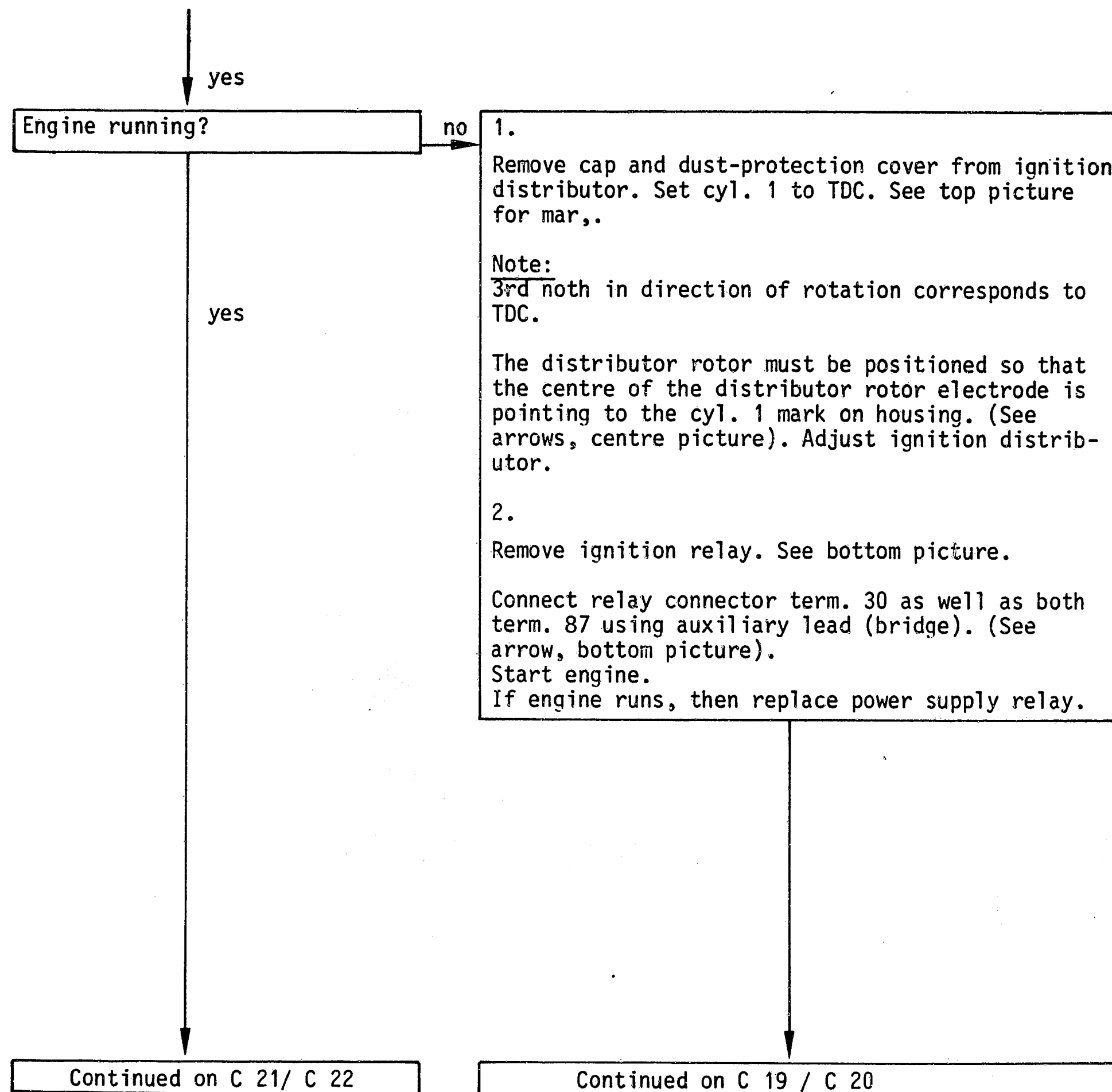
High-voltage arrow:  
Danger, 400 V ... 25 kV





1 = Plug







Continued

3.

Disconnect the negative and positive cables from the battery. Disconnect the trigger-box plug. Switch on the ignition.

Check for contact resistance in cables from positive battery terminal to trigger-box plug term. 4 including cables from negative battery terminal to trigger-box plug term. 2. Total contact resistance max.  $0.3\ \Omega$  (take resistance of test lead with test prods into account). Eliminate contact resistance.

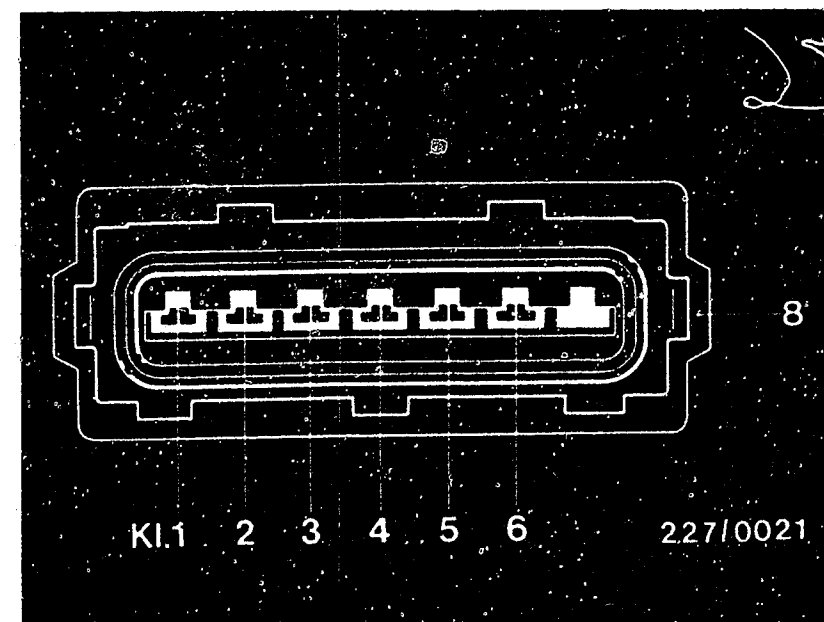
Check for contact resistance in leads from positive battery terminal to ignition coil term. 15 as well as lead from ignition coil term. 1 to trigger-box plug term. 1. Total contact resistance max.  $0.3\ \Omega$  (take resistance of instrument lead with test prods into account). Eliminate contact resistance.

If points 1, 2 and 3 are correct, try installing "new" ignition coil specified.

If engine does not run, reinstall "old" ignition coil and replace trigger box.

yes

Continued on C21/C22



8 = Trigger-box plug

**C19**

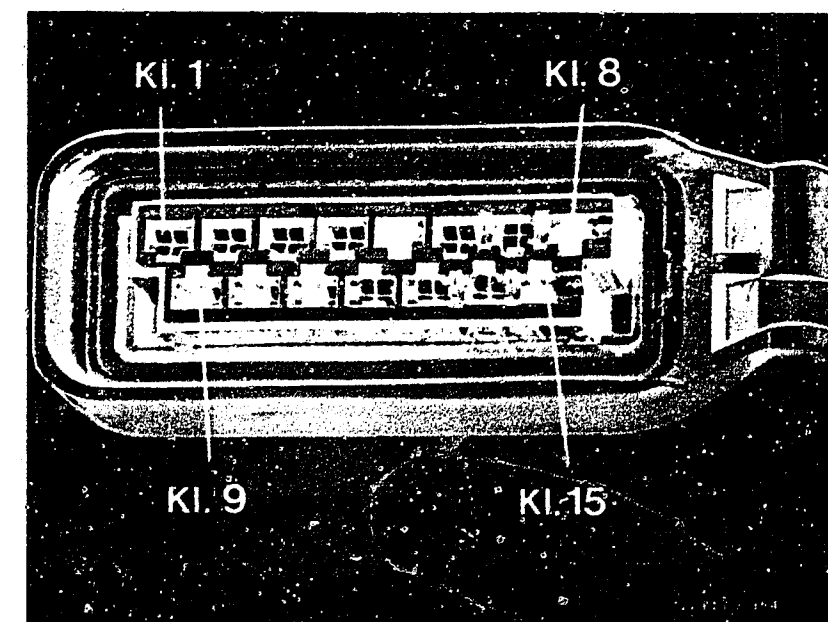
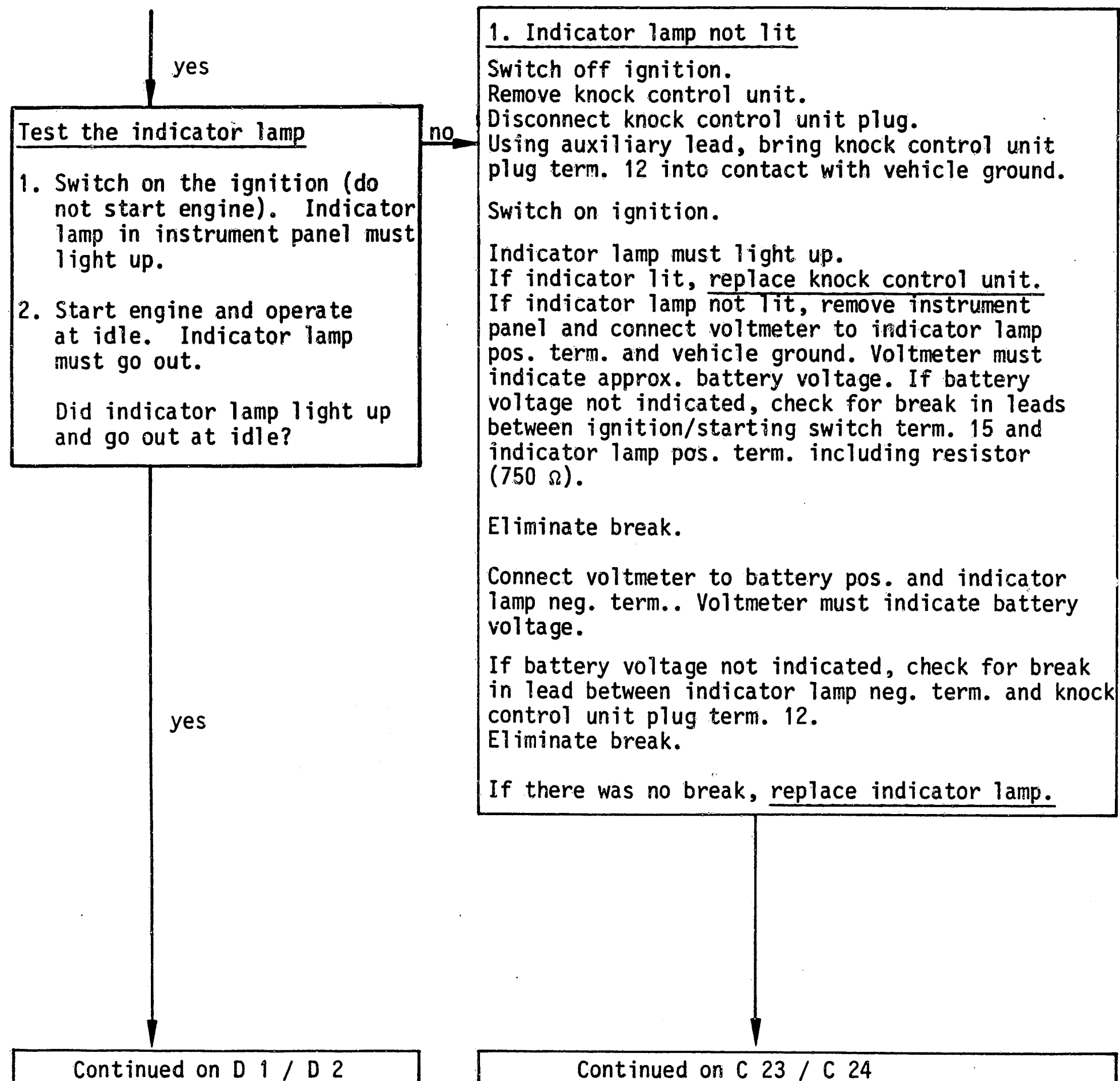
Trouble-shooting program  
Peugeot



**C20**

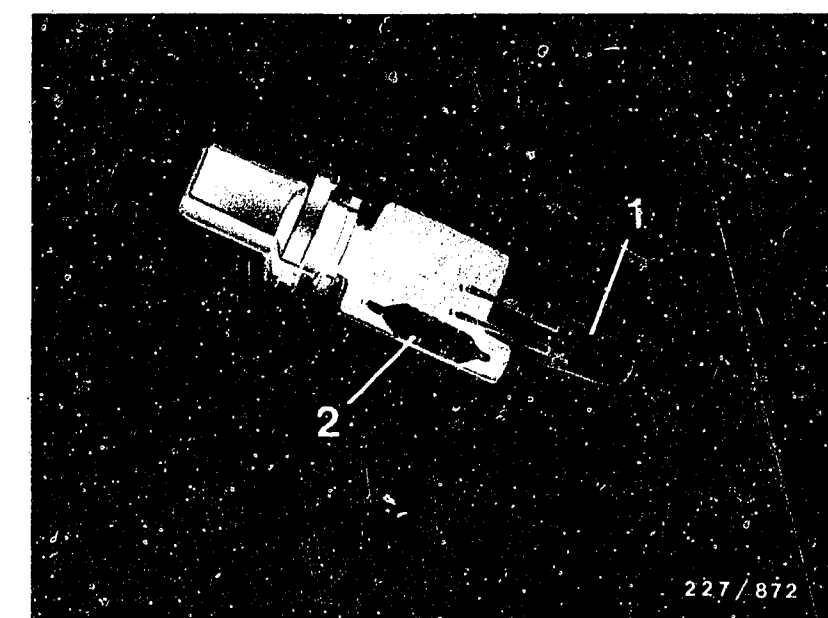
Trouble-shooting program  
Peugeot





Knock control unit plug

1 = Indicator lamp  
2 = Protective resistor



Continued

2. Indicator lamp lit continuously

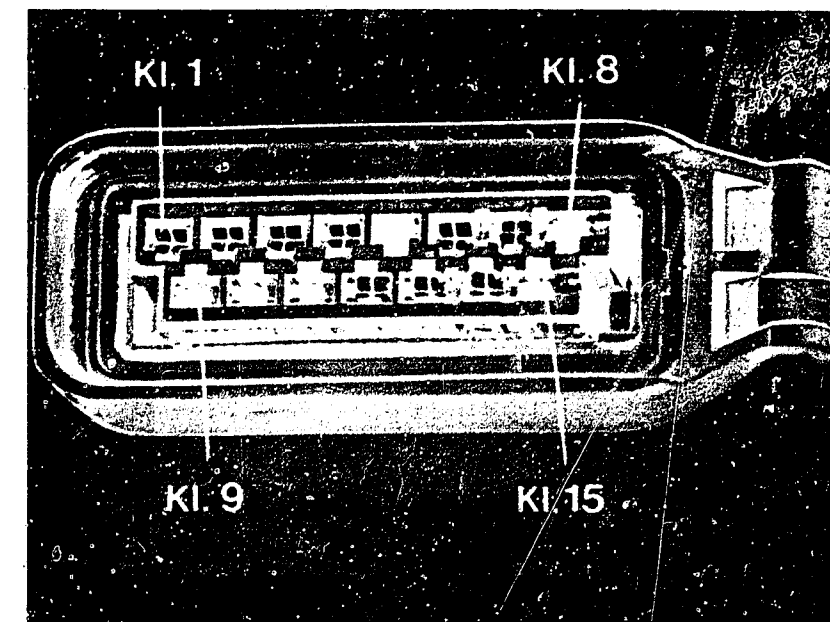
Switch off ignition.  
Remove knock control unit.  
Remove knock control unit plug.  
Switch on ignition.

If indicator lamp no longer lit, then replace  
knock control unit.

If indicator lamp still lit, short circuit  
to ground in indicator lamp or in connecting  
lead term. 12.  
Eliminate short circuit to ground.

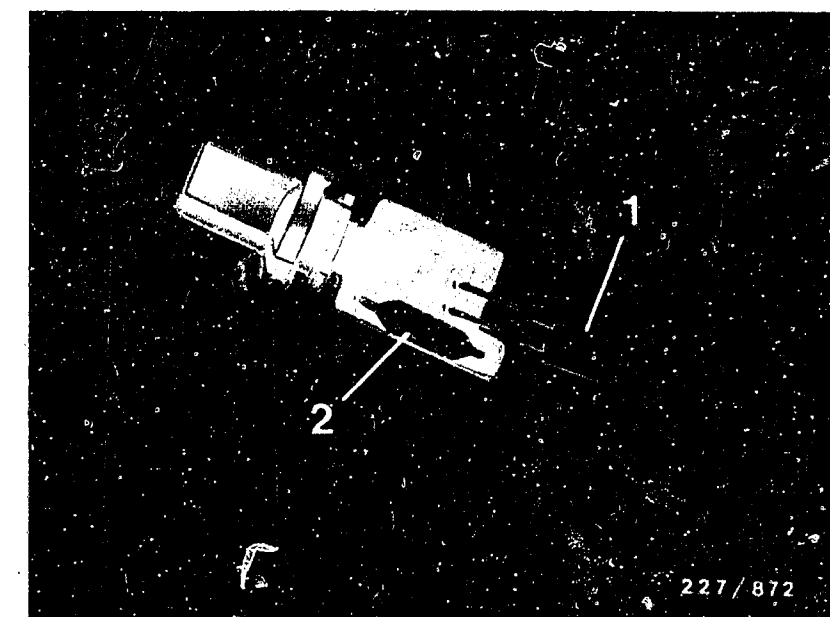
yes

Continued on D1/D2



Knock control unit plug

1 = Indicator lamp  
2 = Protective resistor



**C23**

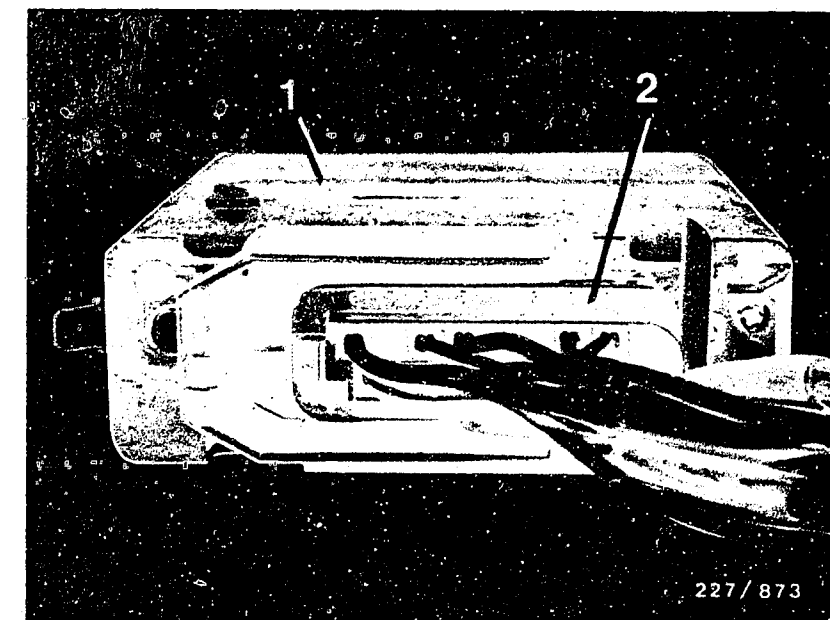
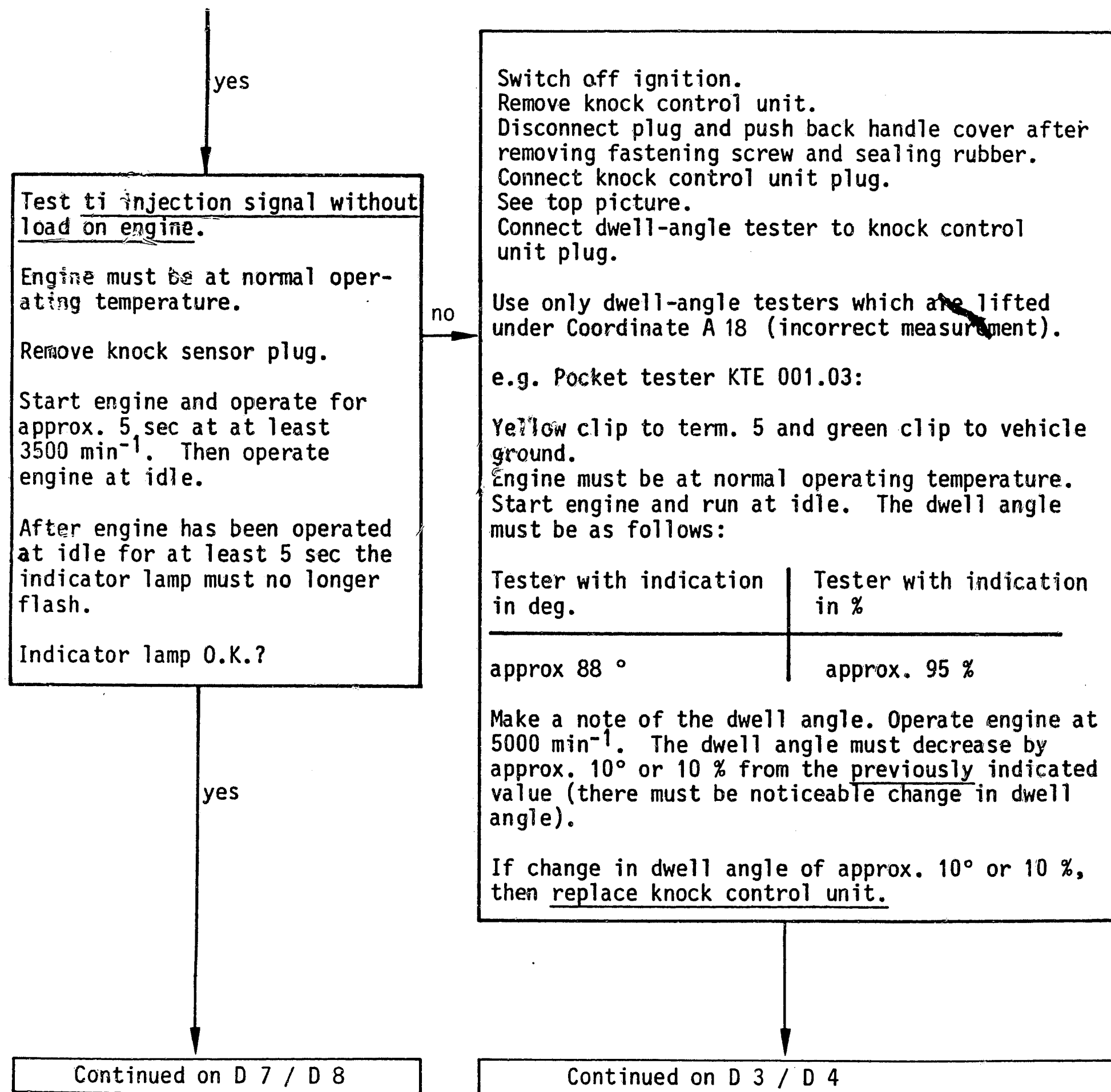
Trouble-shooting program  
Peugeot



**C24**

Trouble-shooting program  
Peugeot





1 = Knock control unit  
2 = Knock control unit plug



Continued

If the indicated dwell angle at idle and 5000 min<sup>-1</sup> was approx. 0° or 0 %, then

1. Remove the L-Jetronic control unit. Remove plugs from knock control unit and L-Jetronic control unit.

Connect ohmmeter to knock control unit plug term. 5 and L-Jetronic control unit plug term. 11. Ohmmeter must indicate continuity. Otherwise eliminate open circuit.

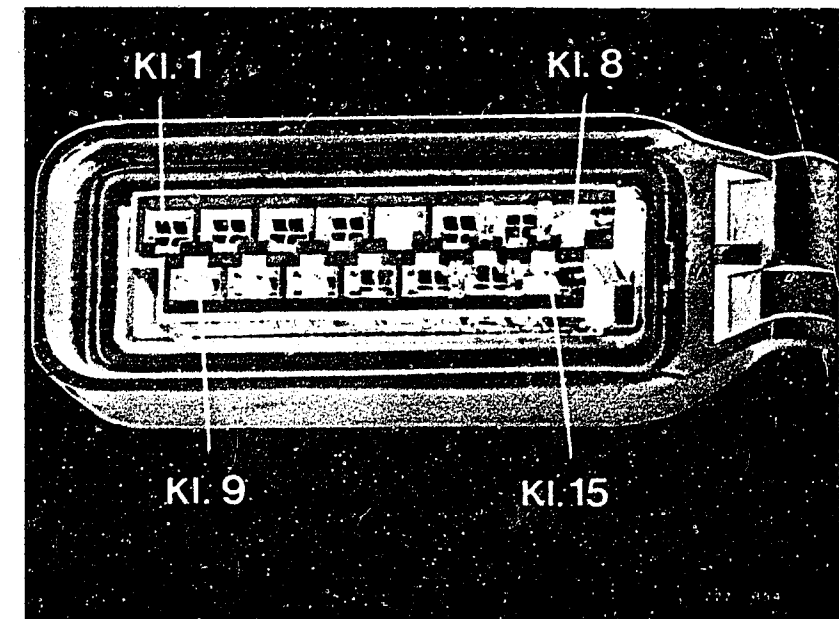
2. Connect ohmmeter to L-Jetronic control unit plug term. 11 and vehicle ground.

Ohmmeter must not indicate continuity. If continuity is indicated, then eliminate short circuit to ground in L-Jetronic control unit lead term. 11.

yes

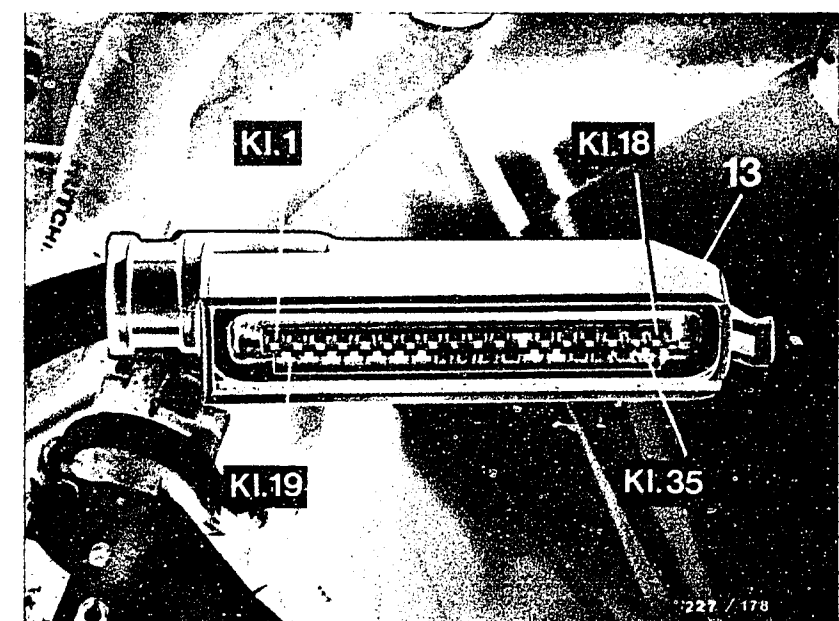
Continued on D7/D8

Continued on D5/D6



Knock control unit plug

13 = L-Jetronic control unit plug



**D3**

Trouble-shooting program  
Peugeot



**D4**

Trouble-shooting program  
Peugeot



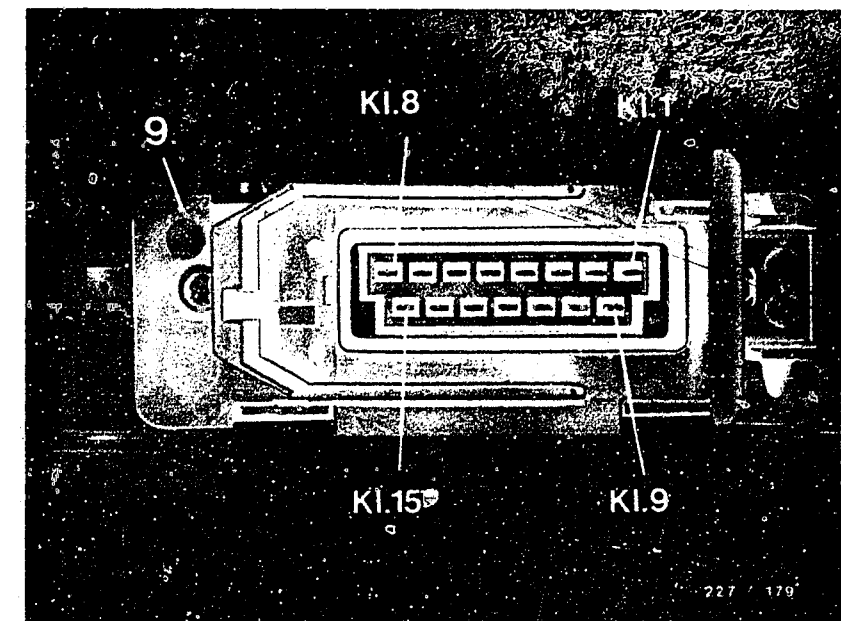
Continued

3. Connect ohmmeter to knock control unit term. 5 and term. 8.

Ohmmeter must indicate 47...72 k $\Omega$ .

If the resistance is not correct, then replace knock control unit.

If the resistance is correct, then replace L-Jetronic control unit.



9 = Knock control unit

yes

Continued on D7/D8

**D5**

Trouble-shooting program  
Peugeot



**D6**

Trouble-shooting program  
Peugeot



yes

Test ti injection signal with engine under load.

Engine must be at normal operating temperature.

Remove knock sensor plug.

Remove top part of air filter and air filter element. (See top picture, arrow).

Start engine and operate at 5000 min<sup>-1</sup>.  
Maintain accelerator position during following measurement.

2. Person must open air-flow sensor flap as far as it will go using suitable object (screwdriver or similar).  
(See bottom picture).

Note:

As a result of overenrichment there will be a sharp drop in engine speed, possibly with the engine stopping.

Indicator lamp must flash above 1000 min<sup>-1</sup>.

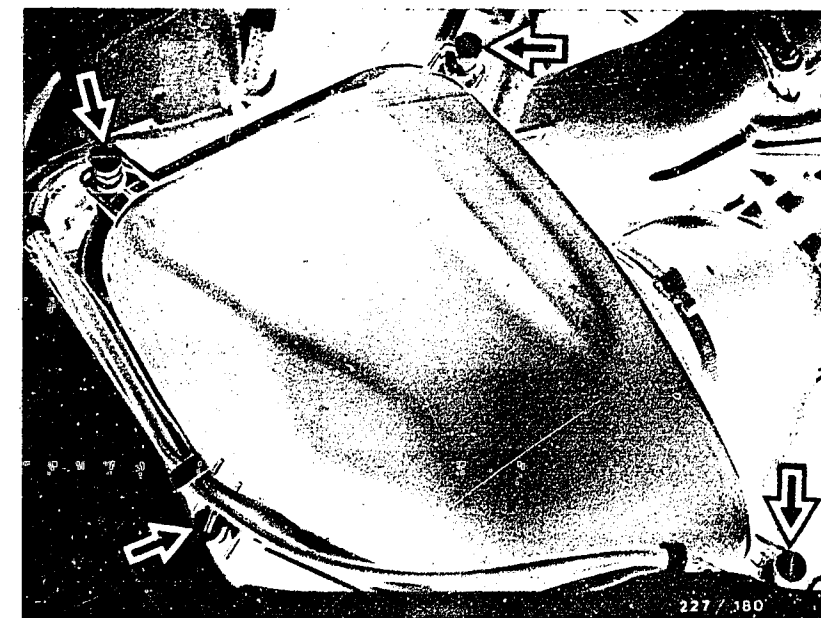
Indicator lamp O.K.?

no

Replace L-Jetronic control unit.

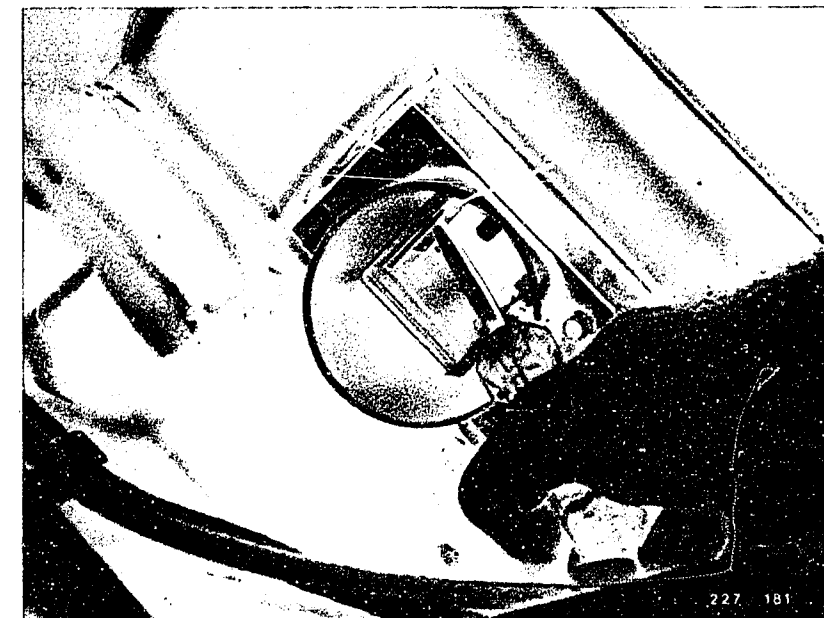
yes

Continued on D9



1 = Top part of air filter

1 = Air-flow sensor  
2 = Sensor flap (fully opened)



**D7**

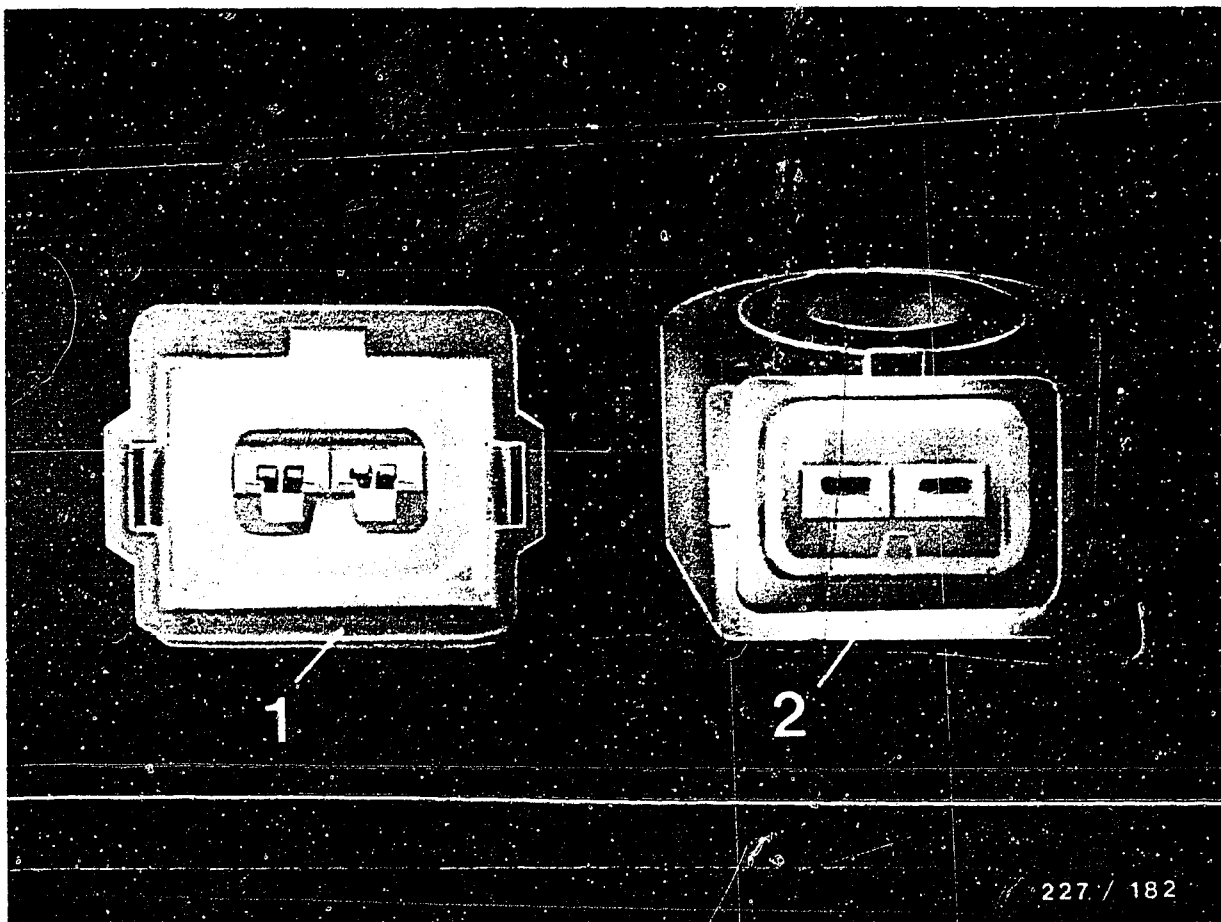
Trouble-shooting program  
Peugeot



**D8**

Trouble-shooting program  
Peugeot





1 = Knock sensor plug

2 = Knock sensor socket

↓  
yes

Test knock sensor plug and socket.

Visual examination:

Remove knock sensor plug.

Check contacts of knock sensor plug and socket for oxidation. - Eliminate oxidation.

Reconnect knock sensor plug.

If customer complaint not yet eliminated, then continue testing.

↓  
yes

Continued on D10/D11

**D9**

Trouble-shooting program

Peugeot





yes

Test knock control unit power supply.

Switch off ignition.  
Remove knock control unit.

Disconnect plug and push back handle cover  
after removing fastening screw and sealing  
rubber. Connect knock control unit plug.  
See top picture.

Connect voltmeter to knock control unit plug  
(term. 14 (+) and term. 8 (-)).

Run engine at idle ( $> 500 \text{ min}^{-1}$ ).

Voltmeter must indicate between 9 V and  
battery voltage.

Voltage correct?

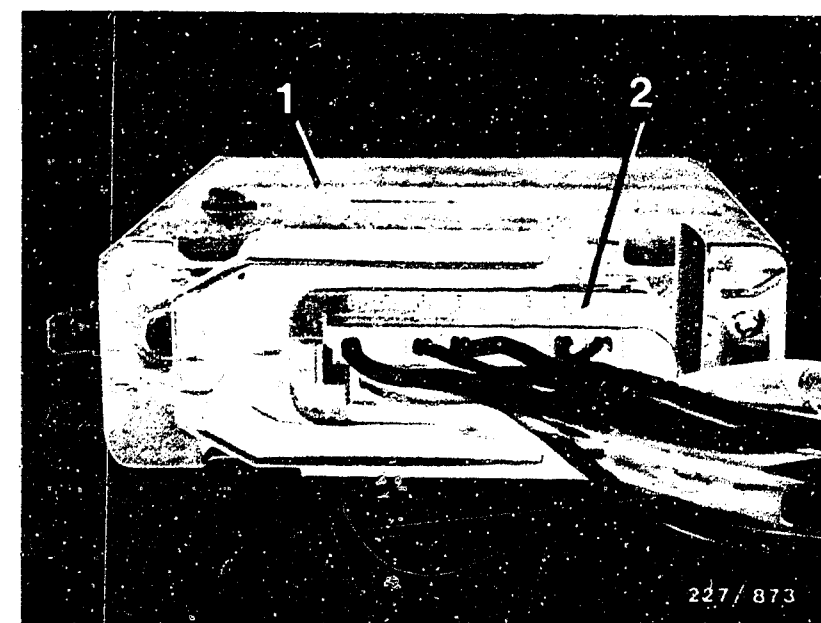
no

1. Connect voltmeter (+) to positive  
battery terminal and knock con-  
trol unit plug term. 14 (-).  
Switch on ignition and run engine  
at idle.  
Voltage drop must be no more  
than 0.5 V. Eliminate voltage  
drop.

2. Connect voltmeter (-) to negative  
battery terminal and knock control  
unit plug term. 8 (+).  
Switch on ignition and run engine  
at idle.  
Voltage drop must be no more than  
0.5 V. Eliminate voltage drop.

yes

Continued on D12/D13



1 = Knock control unit  
2 = Knock control unit plug

**D10**

Trouble-shooting program

Peugeot



**D11**

Trouble-shooting program

Peugeot



yes

### Test monitoring of knock sensor.

Knock sensor plug connected.

Switch off ignition.

Remove knock control unit (1)  
(top picture).

Disconnect plug and push back  
handle cover after removing  
fastening screw and sealing  
rubber.

Connect knock control unit  
plug (2). See top picture.

Using auxiliary lead, bring  
knock control unit plug term.  
5 into contact with ground.  
Top picture.

Start engine and run at at  
least 3500 min<sup>-1</sup>.

Indicator lamp must not light  
up.

Indicator lamp O.K.?

yes

Continued on D 14/ D 15

Switch off ignition.  
Disconnect knock sensor plug and knock control  
unit plug.

1. Connect ohmmeter to:
- |                          |     |                                |
|--------------------------|-----|--------------------------------|
| <u>Knock sensor plug</u> |     | <u>Knock control unit plug</u> |
| (Centre picture)         |     | (Bottom picture)               |
| Term. 1                  | and | Term. 1                        |
| Term.10                  | and | Term.10                        |

Ohmmeter must indicate continuity. Otherwise  
eliminate open circuit.

2. Connect ohmmeter to:

<u>Knock sensor plug</u>		<u>Knock control unit plug</u>
Term. 1	and	Term. 8

Ohmmeter must indicate open circuit (infinity).  
If ohmmeter indicates continuity, then eliminate  
short circuit to ground of knock sensor lead  
term. 1 to term. 10.

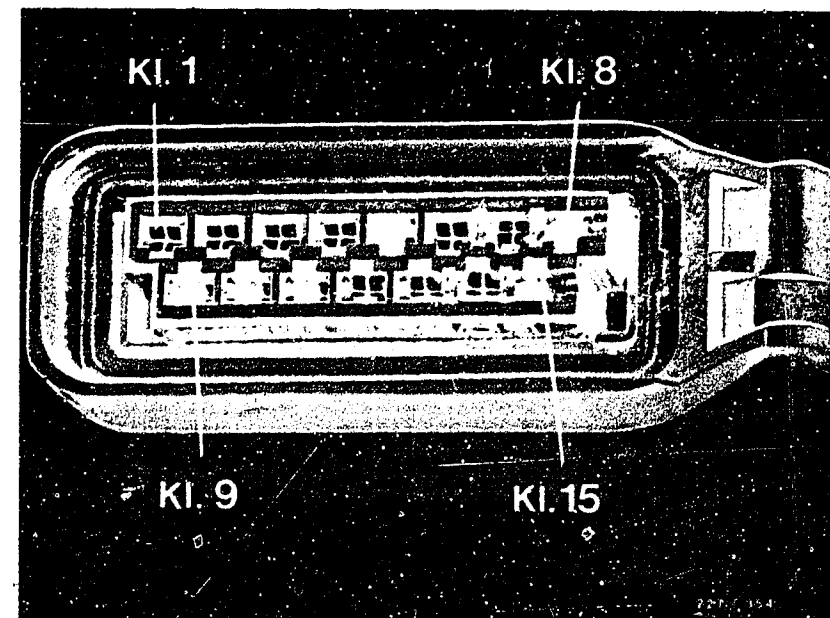
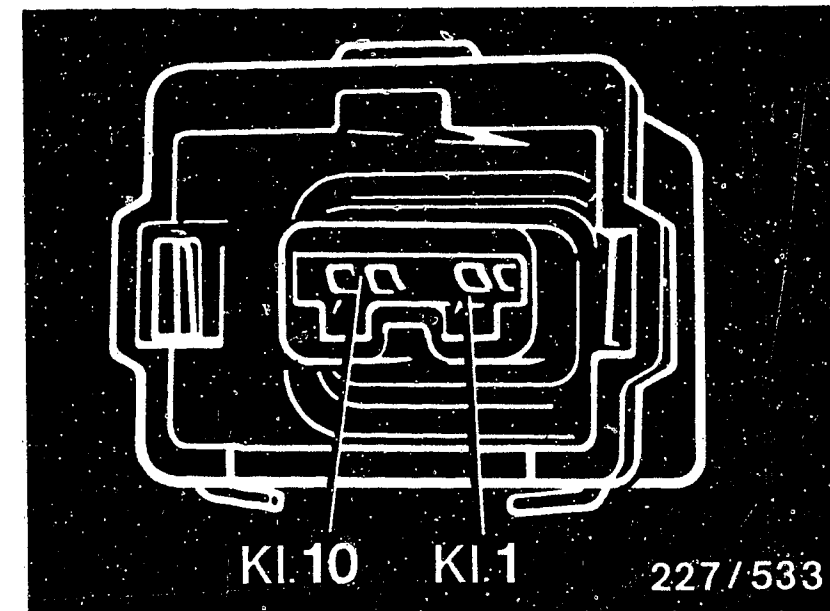
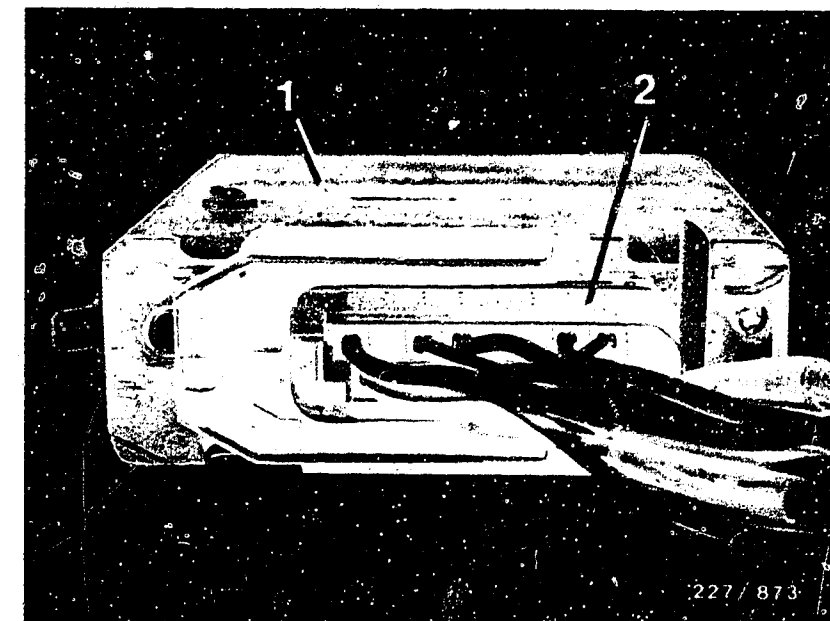
3. Connect knock sensor plug.  
Connect ohmmeter to:

<u>Knock control unit</u>		<u>Knock control unit</u>
<u>plug</u>		<u>plug</u>
Term. 1	and	Term. 10

Ohmmeter must indicate 270...330 k $\Omega$ .  
If resistance not correct, then replace knock  
sensor.

4. Check tightening torque 11...15 Nm of knock  
sensor fastening screw.

If points 1 to 4 O.K., then replace knock sensor



D12

Trouble-shooting program

Peugeot



D13

Trouble-shooting program

Peugeot



yes

Test knock control unit evaluation circuit.

Knock sensor plug connected.

Switch off ignition.

Remove knock control unit.

Disconnect plug and push back handle cover after removing fastening screw and sealing rubber.

Connect knock control unit plug. See top picture.

Using auxiliary lead, bring knock control unit plug term. 5 into contact with vehicle ground.

Start engine and run between 500 and 1600 min<sup>-1</sup>.

Caution:

When starting and while testing, do not exceed 2800 min<sup>-1</sup>; otherwise incorrect measurement.

If 2800 min<sup>-1</sup> has been exceeded, switch off ignition and start again.

Indicator lamp must not light up.

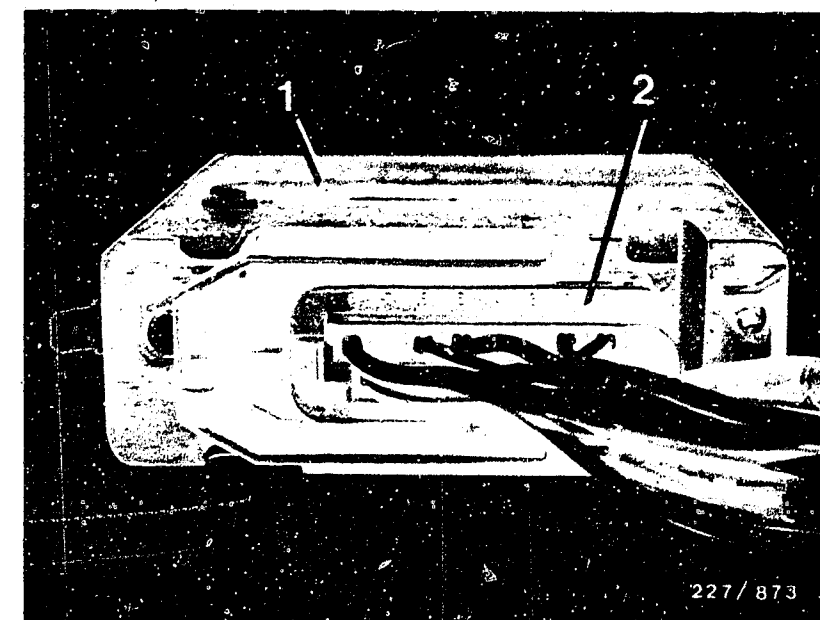
Indicator lamp O.K.?

no

Replace knock control unit

yes

Continued on D16/D17



1 = Knock control unit

2 = Knock control unit plug

**D14**

Trouble-shooting program

Peugeot



**D15**

Trouble-shooting program

Peugeot



yes

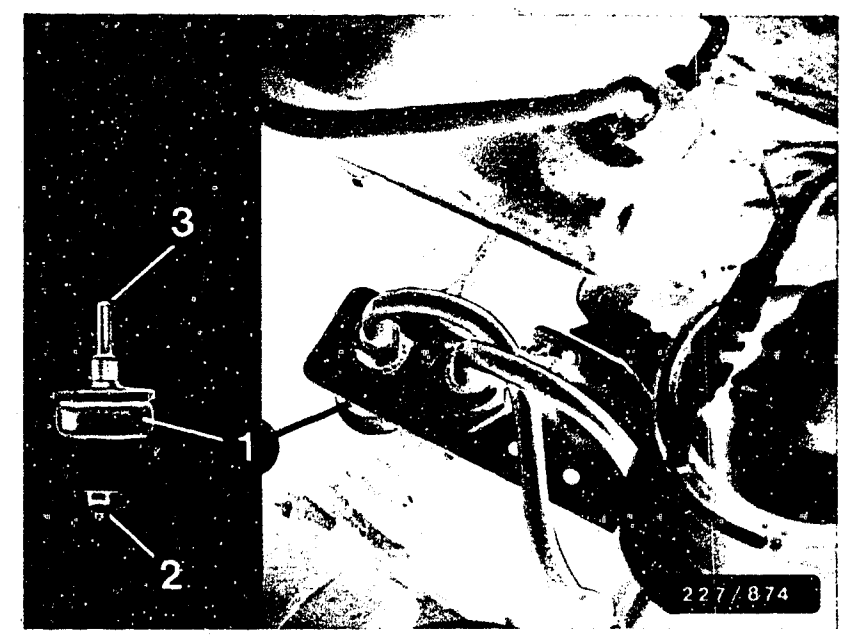
Check change-over relay for part-load ignition advance. Connect electrical connection of pressure switch to vehicle ground using auxiliary lead. (Good ground must be ensured). See upper illustration. Switch ignition on and off. Switching of the change-over relay must be detectable audibly and by feeling. Change-over relay has switched?

no

Disconnect change-over relay, electrical connection of pressure switch applied to vehicle ground. Switch on ignition. Connect voltmeter to relay base term. 1 (+) and term. 2 (-), see lower illustration. Voltmeter must indicate approx. battery voltage. If voltage supply is O.K., replace change-over relay. If no voltage indicated, check following leads for continuity: From relay base term. 1 to ignition lock term. 15 and from relay base term. 2 to pressure switch. Eliminate short circuits.

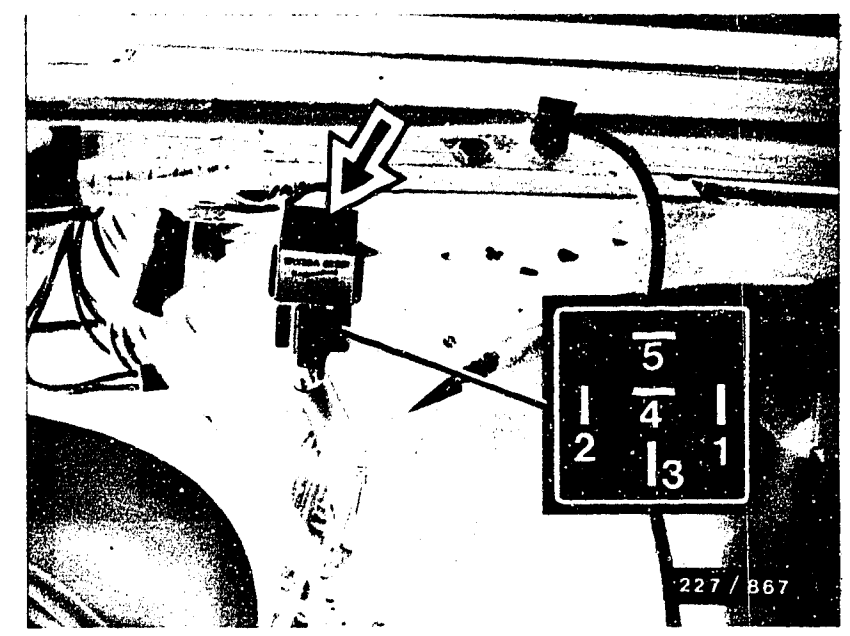
yes

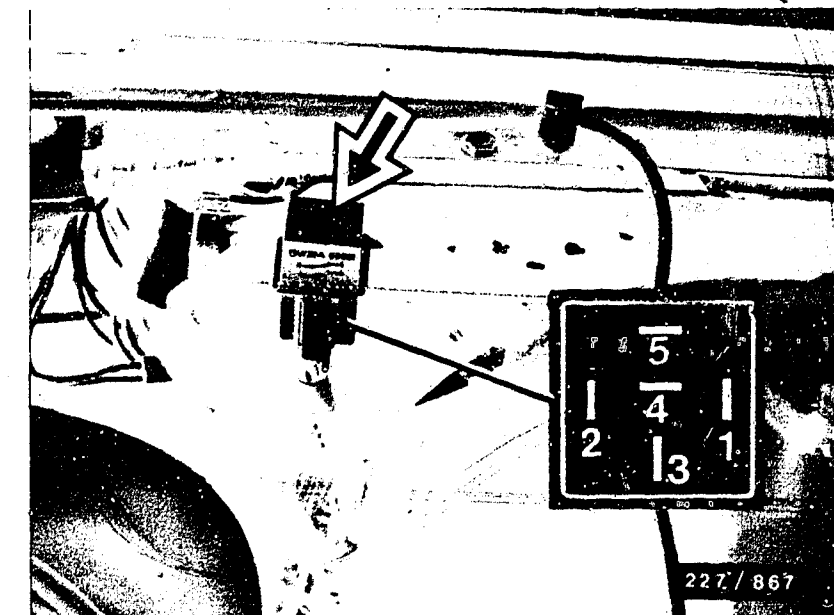
Continued on D18/D19



- 1 = Pressure switch
- 2 = Electrical connection to ground using auxiliary lead
- 3 = Pressure connection

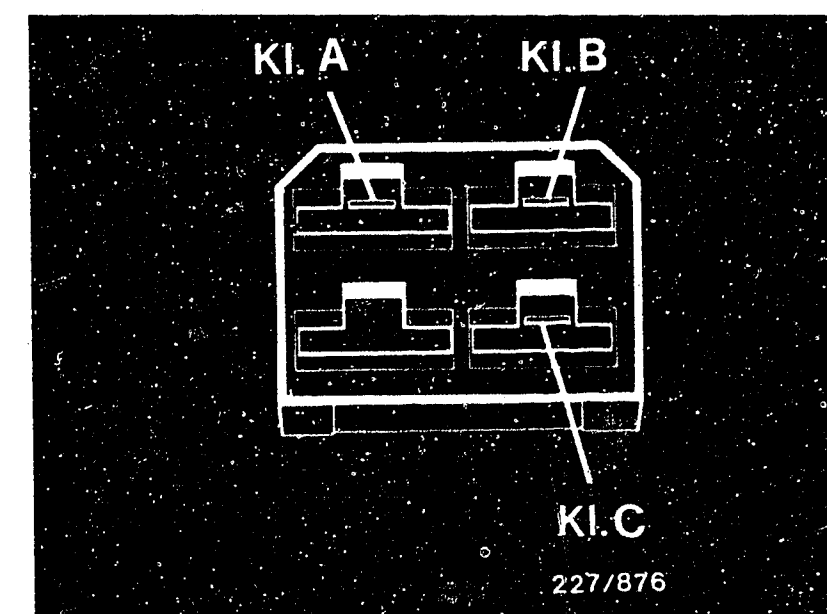
Arrow: Change-over relay for part-load ignition advance





Arrow:  
Change-over relay for part-load ignition advance.  
Detail:  
View of relay plug.

Spark-advance mechanism plug



yes

### Test basic ignition setting.

(In case of clearly incorrect indication of engine speed on testers, connect in series resistor or convert motortester).

Bring engine to operating temperature (engine oil  $> 60^{\circ}\text{C}$ ).

Electrical connection of pressure switch is still connected to vehicle ground with auxiliary lead. See top picture.

Run engine at  $4000 \pm 50 \text{ min}^{-1}$ .

Flash timing light at ignition mark.

Basic ignition setting must be  $44^{\circ}$  BTDC.

#### Note:

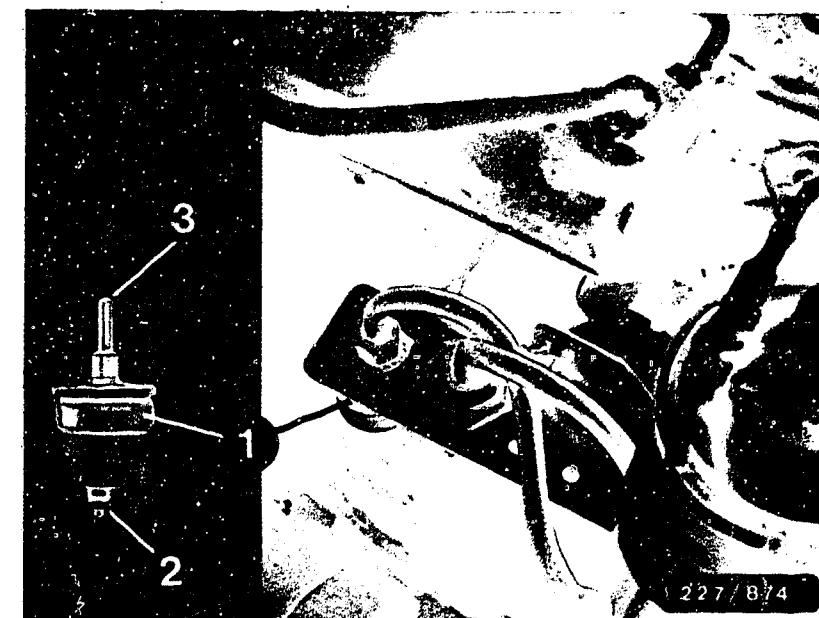
1st notch (red) in direction of rotation corresponds to  $44^{\circ}$  BTDC.  
See bottom picture.

Basic ignition setting O.K.?

no

Loosen distributor mounting and turn ignition distributor until  $44^{\circ}$  BTDC is reached.

See bottom picture for mark.



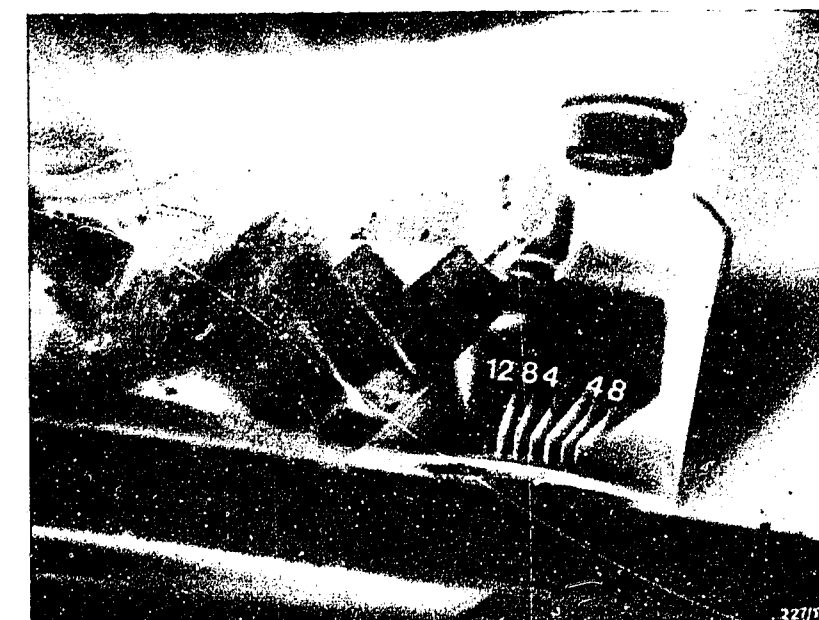
- 1 = Pressure switch
- 2 = Electrical connection with auxiliary lead to ground
- 3 = Pressure connection

yes

Remove auxiliary lead from pressure switch.  
See top picture.

yes

Continued on D22/D23



D20

Trouble-shooting program  
Peugeot



D21

Trouble-shooting program  
Peugeot



yes

Test pressure switch.

Visual examination:

Check pressure line for damage (cracks etc.) and check all connections for security. See arrow, top picture.

Pressure test:

Remove pressure switch and connect to adjusting throttle as shown in connection diagram (bottom picture).

Connect ohmmeter to pressure switch. See bottom picture.

Set approx. 0.6 bar gauge pressure at pressure regulator.

Note on adjusting throttle:  
Adjusting screw (bottom) for setting the pressure.  
Screw plug (top) is open during testing.

Ohmmeter indicates

approx.  $0 \Omega$  at  $< 80 \text{ m bar}$   
 $\infty \Omega$  at  $> 120 \text{ m bar}$

Resistance values O.K.?

no

Replace pressure switch.

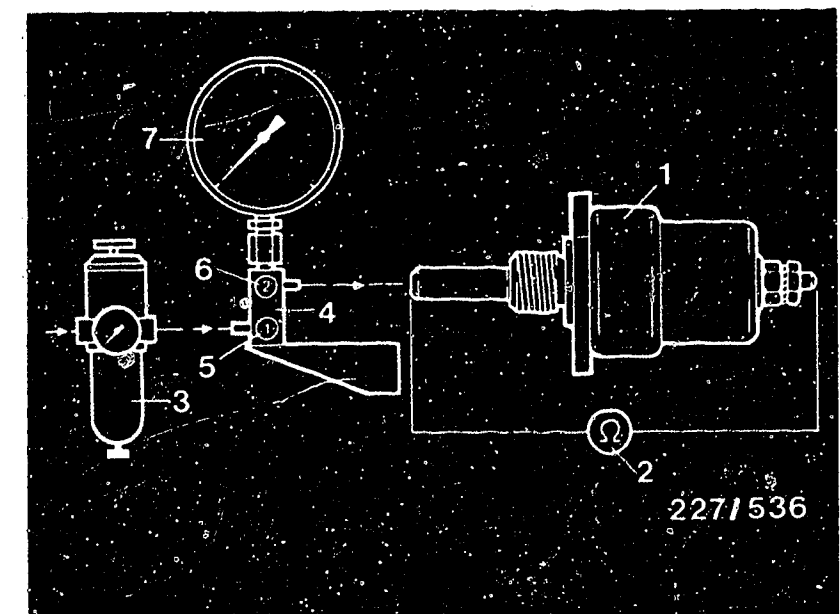
yes

Continued on E1/E2



Arrow = Pressure switch

- 1 = Pressure switch
- 2 = Ohmmeter
- 3 = Pressure regulator
- 4 = Adjusting throttle
- 5 = Adjusting screw
- 6 = Screw plug
- 7 = Pressure gauge



**D 22**

Trouble-shooting program

Peugeot

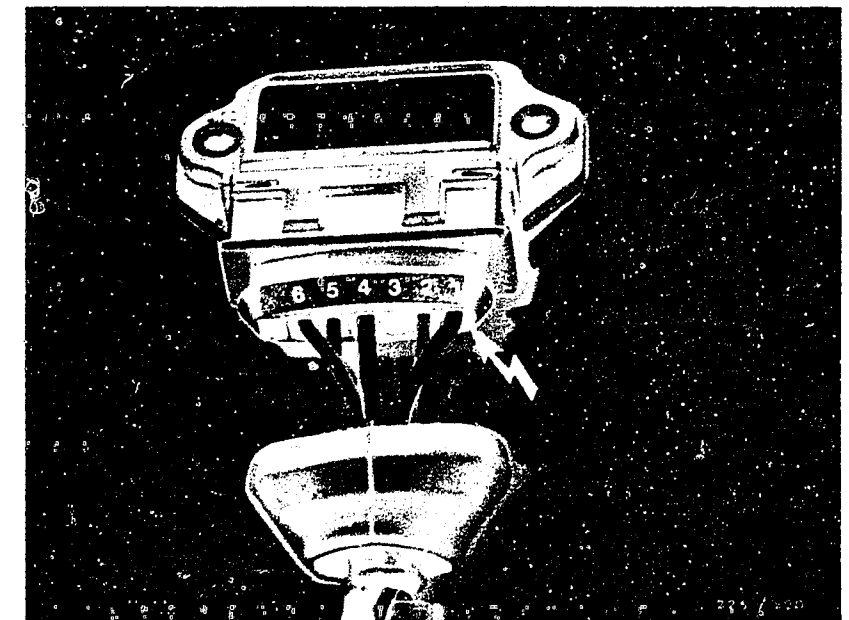
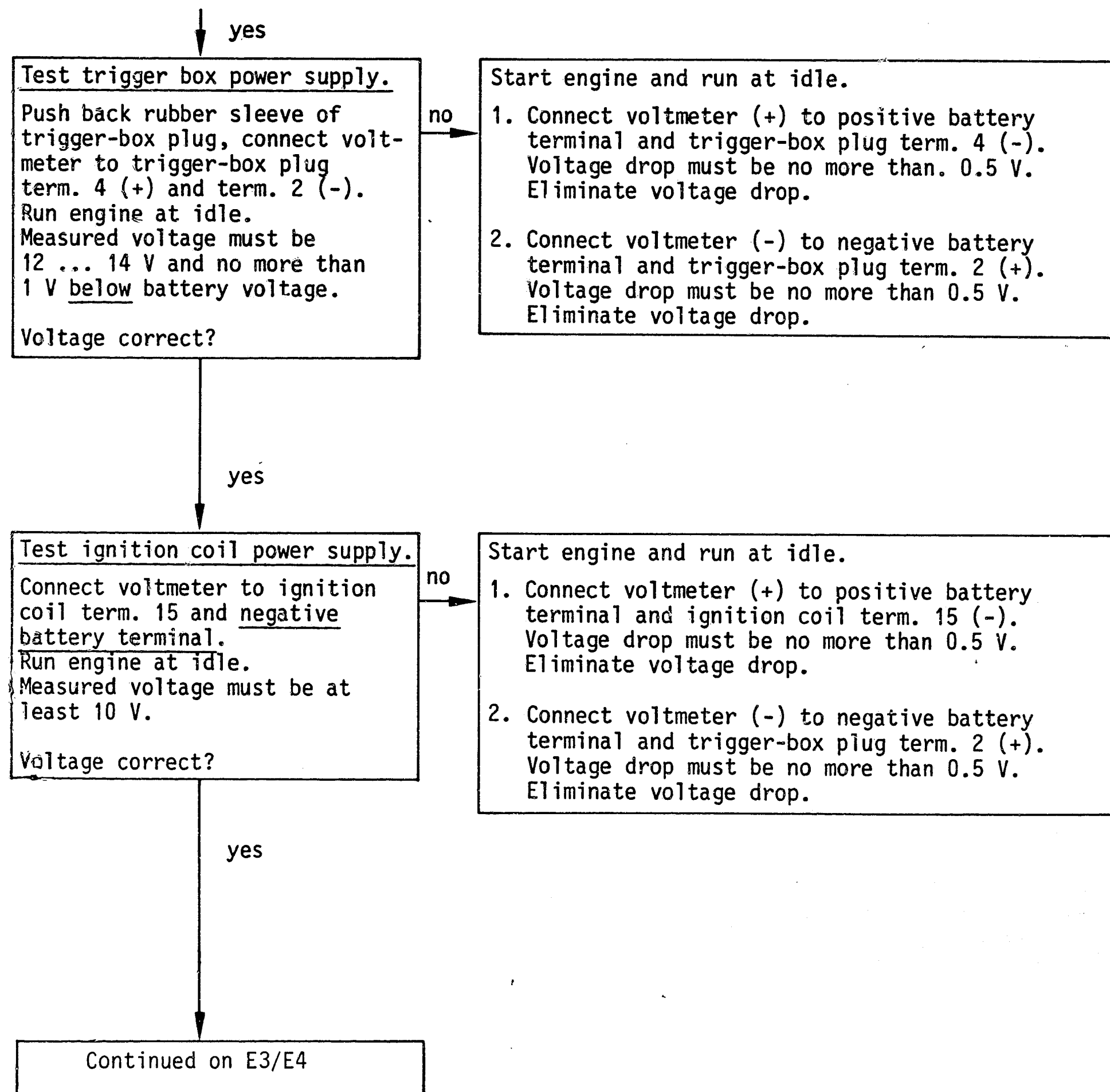


**D 23**

Trouble-shooting program

Peugeot





Trigger-box plug  
High-voltage arrow:  
Danger, high voltages  
(400V - 25 kV)





yes

Test primary voltage.  
(If MOT series available)

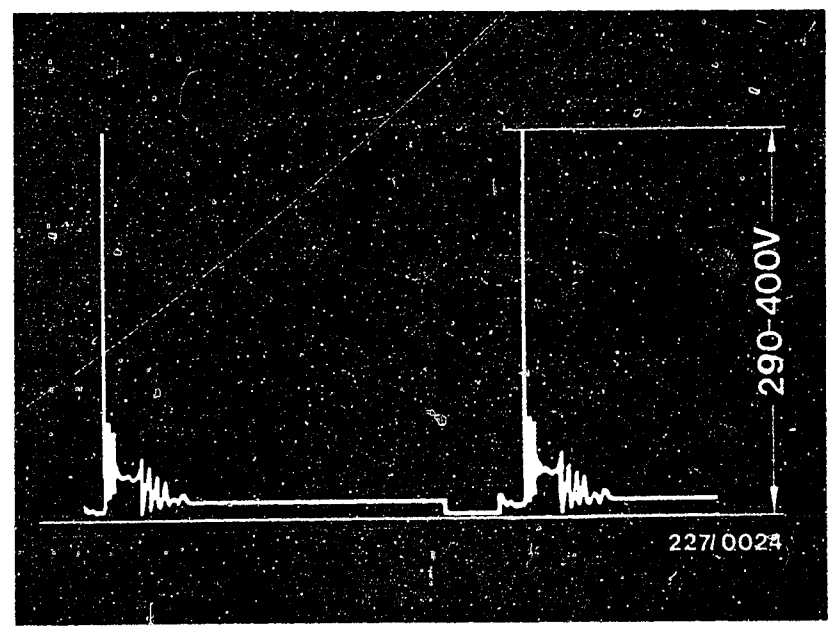
Connect oscilloscope (e.g. MOT 201) to  
ignition coil as per operating instructions.  
Run engine at idle.

The measured primary voltage must be  
290 ... 400 V (see diagram).

Voltage O.K.?

no

Replace trigger box.



yes

Continued on E5

yes

If all test steps O.K. and customer complaint still not eliminated, try installing "new" ignition coil specified.

If customer complaint still not remedied, reinstall "old" ignition coil.

Ignition system O.K.

End of testing.

Testing as of F1 no longer necessary.

Note:

If customer complaint still not eliminated, further possible faults are in the fuel system, or engine not mechanically O.K.



No primary signal or no ignition spark.  
(Continued from C13/C14).

yes

Test ignition distributor  
connector and socket.

Release locking wire on ignition  
distributor connector  
See arrow, top picture.

Remove ignition distributor  
connector.

Visual examination:

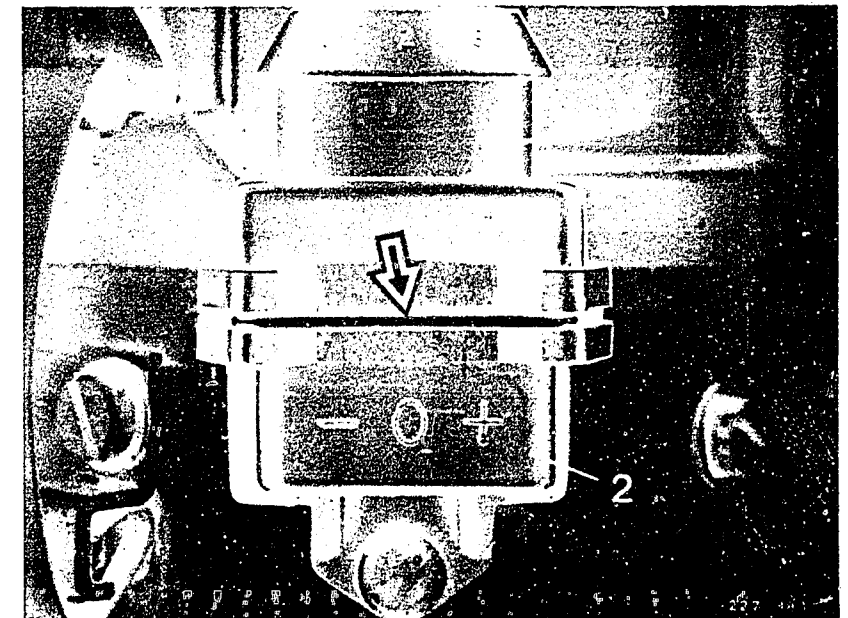
Check contacts of ignition  
distributor connector and  
socket for oxidation.

Eliminate oxidation. Reconnect  
ignition distributor connector.  
Start engine.

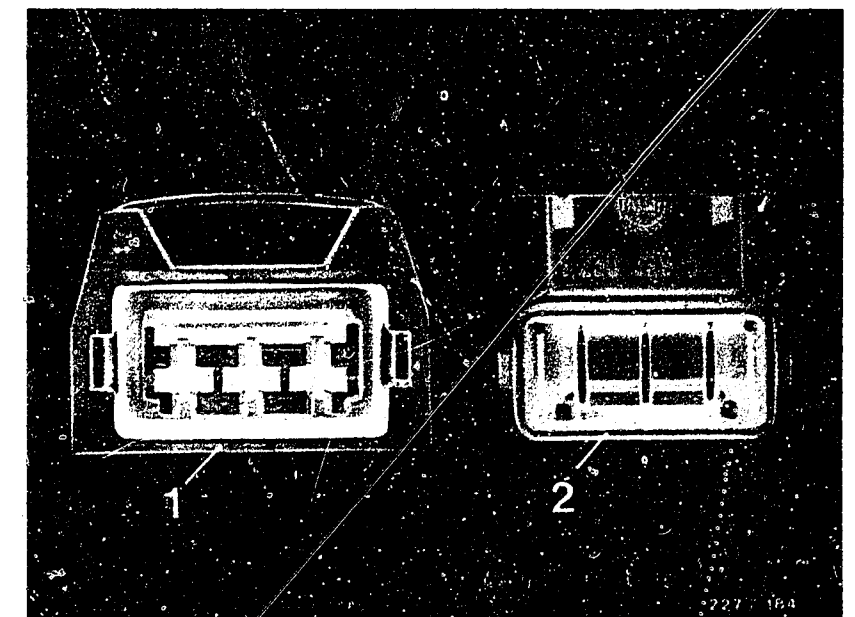
If primary signal/ignition spark not  
present, continue testing.

yes

Continued on F3/F4



1 = Ignition distributor connector  
2 = Ignition distributor socket



**F1**

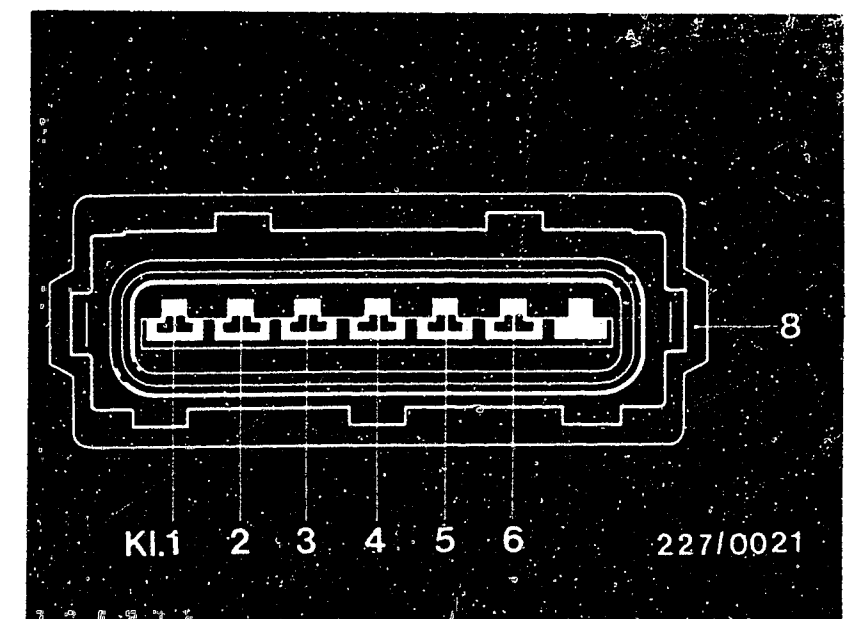
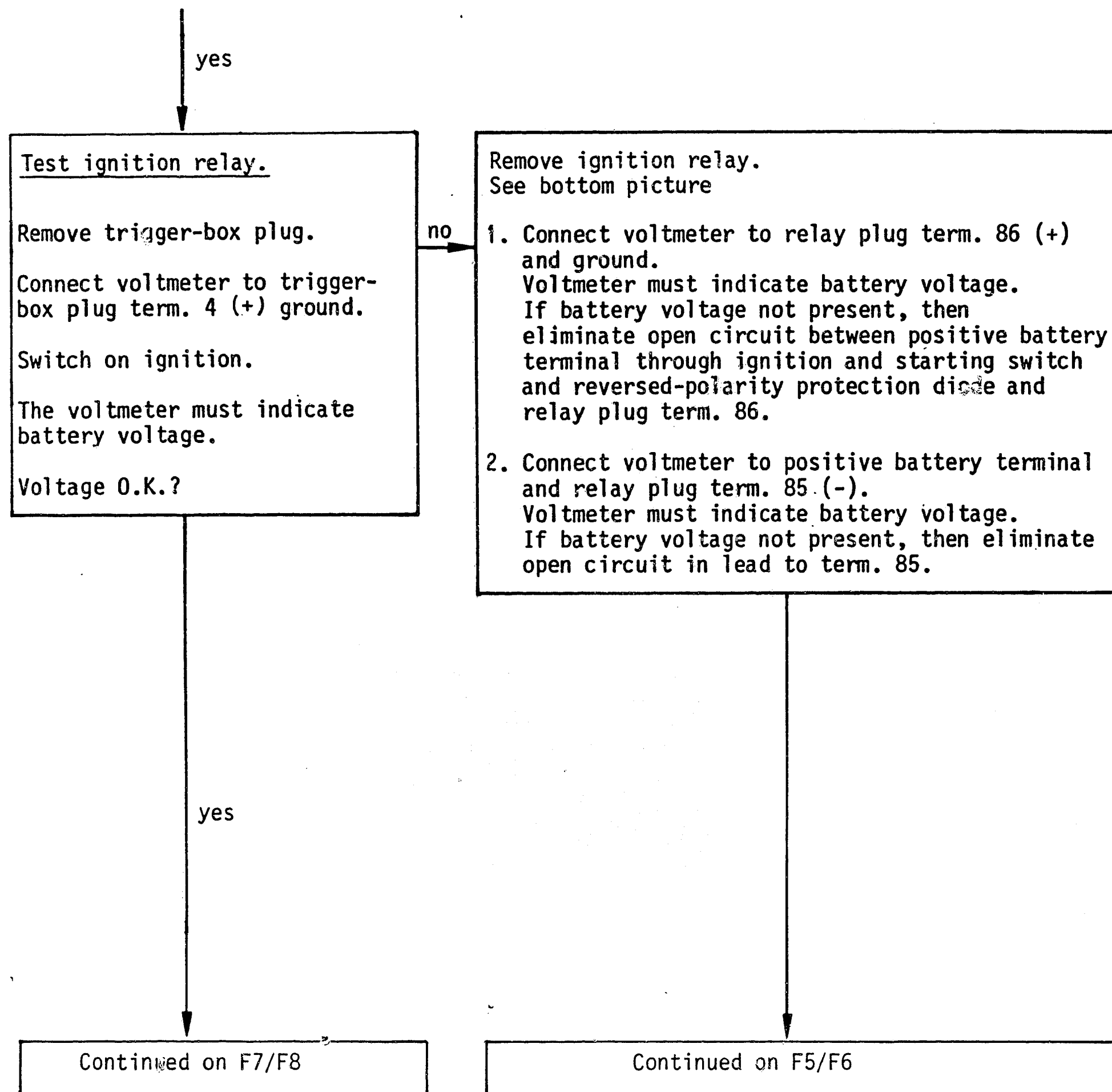
Trouble-shooting program  
Peugeot



**F2**

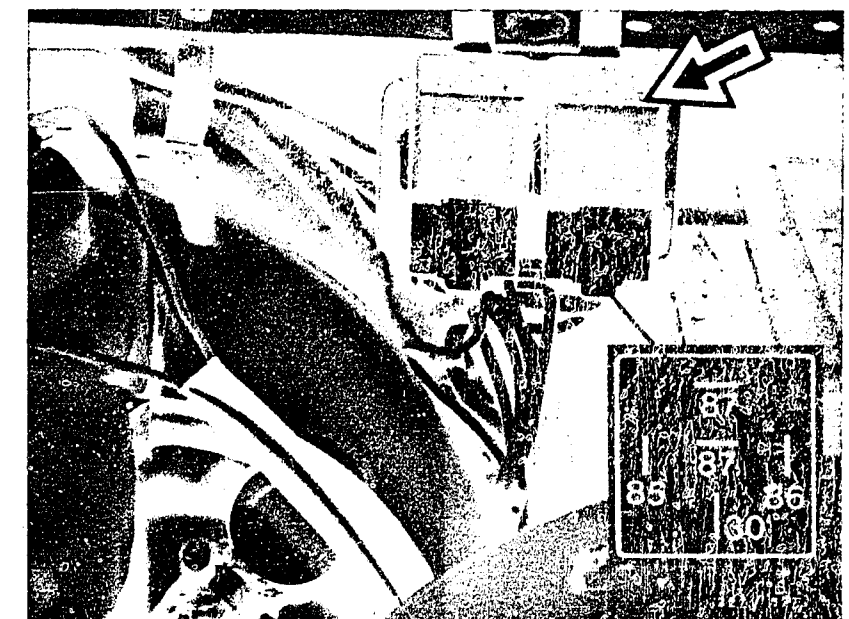
Trouble-shooting program  
Peugeot





8 = Trigger-box plug

Arrow = Ignition relay with relay plug



Continued

3. Connect relay plug term. 30 and both term. 87 using auxiliary lead (bridge).  
(See arrow, bottom picture).

Connect voltmeter to vehicle ground and, one after the one, to relay plug term. 30, 87 and 87 and trigger-box plug term. 4.

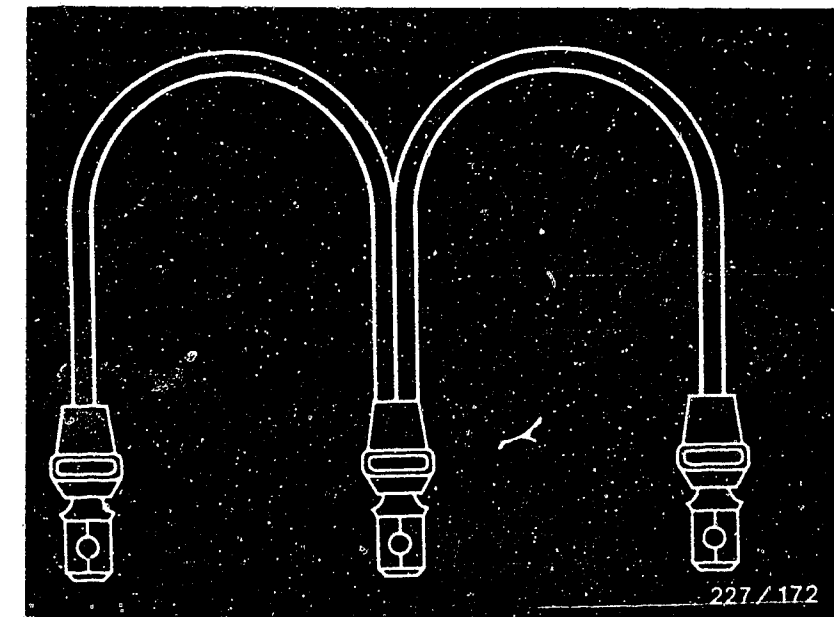
In each case voltmeter must indicate battery voltage.

If battery voltage not present, then eliminate open circuit.

If points 1, 2 and 3 O.K., replace ignition relay.

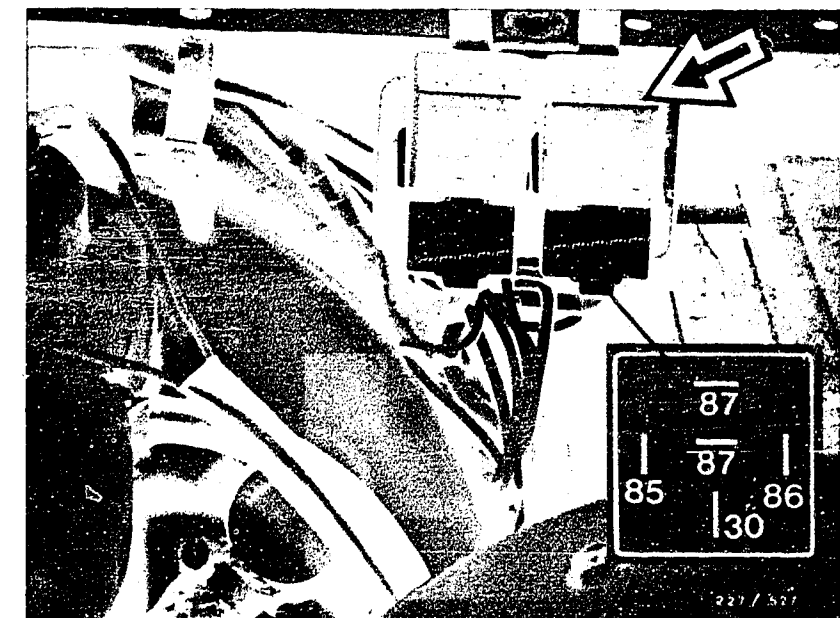
yes

Continued on F7/F8



Auxiliary lead (bridge)

Arrow = Ignition relay



**F5**

Trouble-shooting program

Peugeot



**F6**

Trouble-shooting program

Peugeot



yes

Test ignition pulse generator power supply.

Ignition distributor plug connected.

Push back rubber sleeve of ignition distributor plug.

Connect voltmeter to ignition distributor plug term. 8h (+) and term. 31d (-).  
See top picture.

Switch on ignition.

Voltmeter must indicate a voltage of > 10 V.

Voltage correct?

no

Switch off ignition.  
Disconnect ignition distributor plug (top picture) and ignition relay (bottom picture).  
Remove timing-advance unit and disconnect 6-pin plug (centre picture).

Connect ohmmeter consecutively to:

- |                                     |     |                                 |
|-------------------------------------|-----|---------------------------------|
| 1. <u>Ignition distributor plug</u> |     | <u>Timing-advance unit plug</u> |
| Term. 8h                            | and | Term. 8h                        |
| Term. 31d                           | and | Term. 31d                       |
|                                     |     | (Centre contact)                |

Ohmmeter must indicate approx. 0  $\Omega$  (continuity) in both cases. Eliminate open circuit.

- |                                    |     |                         |
|------------------------------------|-----|-------------------------|
| 2. <u>Timing-advance unit plug</u> |     | <u>Battery negative</u> |
| Term. 31d                          | and | Term. 31                |

Ohmmeter must indicate approx. 0  $\Omega$  (continuity).  
Eliminate open circuit.

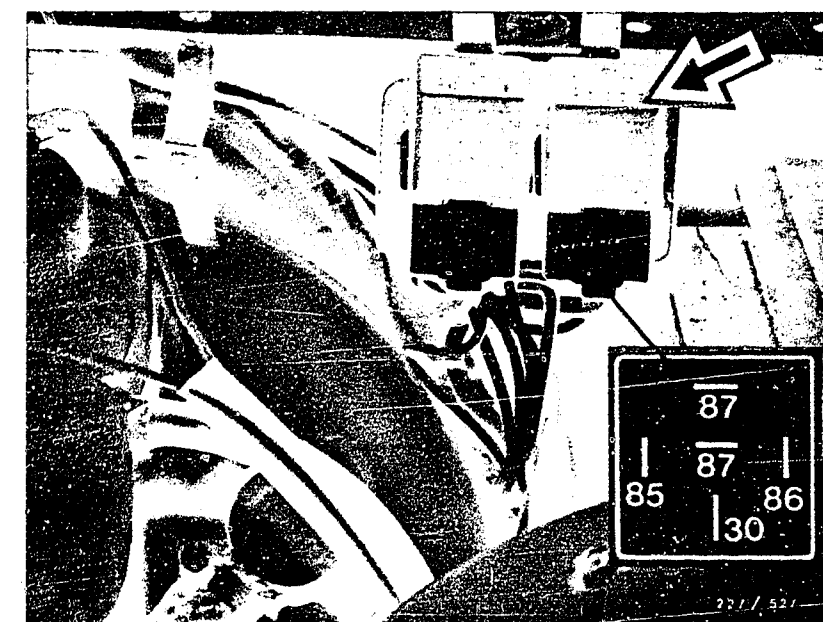
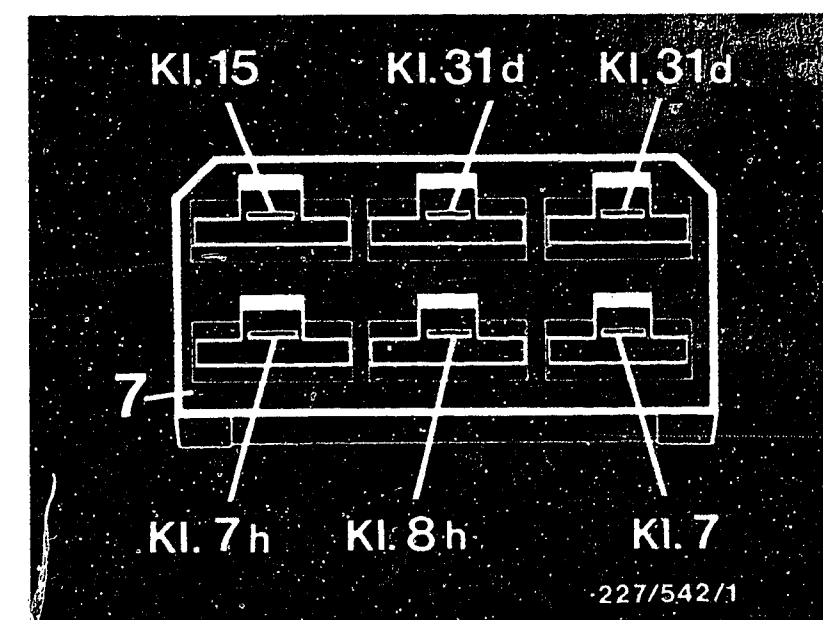
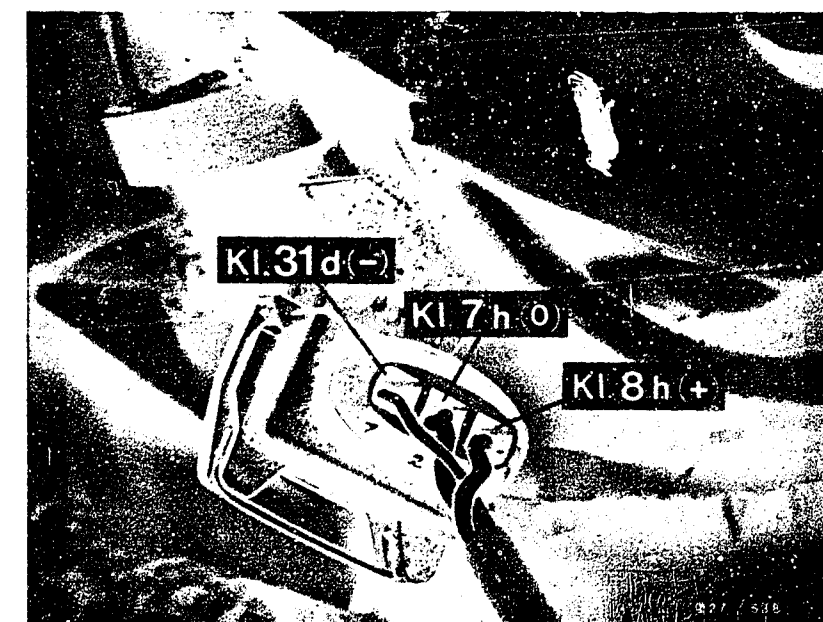
- |                                    |     |                            |
|------------------------------------|-----|----------------------------|
| 3. <u>Timing-advance unit plug</u> |     | <u>Ignition relay plug</u> |
| Term. 15                           | and | Term. 87                   |
|                                    |     | (Arrow-bottom picture)     |

Ohmmeter must indicate approx. 0  $\Omega$  (continuity).  
Eliminate open circuit.

If there was no open circuit in points 1, 2 and 3, replace timing-advance unit.

yes

Continued on F9/F10



**F7**

Trouble-shooting program

Peugeot



**F8**

Trouble-shooting program

Peugeot



yes

Test ignition pulse generator.

Ignition distributor plug connected.

Connect oscilloscope as per operating instructions with program switch in "special" position.

For example, MOT 201:  
Red clamp to ignition distributor plug term. 7h (measured signal).

Black clip to vehicle ground.

Start engine.

The oscilloscope must show a rectangular pulse. See diagram.

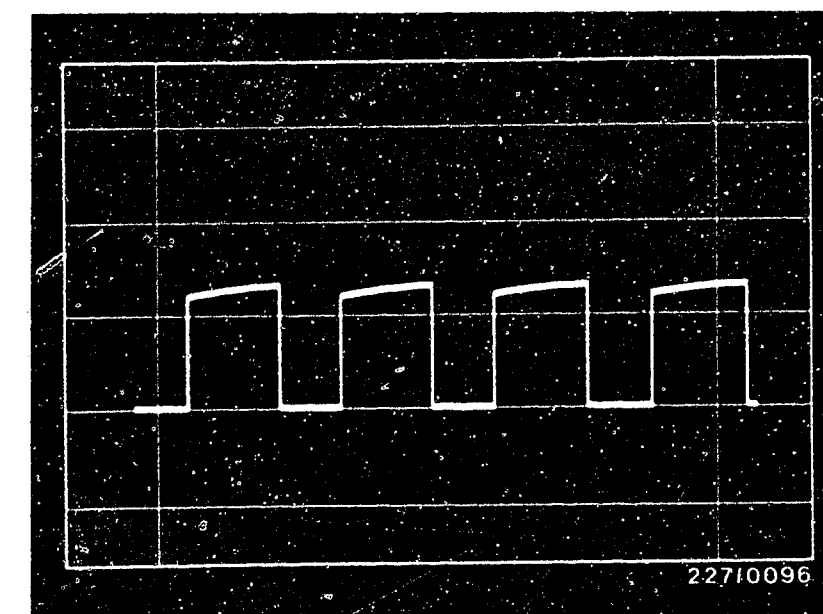
Rectangular pulse present?

no

Replace ignition pulse generator and/or ignition distributor.

yes

Continued on F11/F12



**F9**

Trouble-shooting program  
Peugeot



**F10**

Trouble-shooting program  
Peugeot



yes

### Test ignition timing unit pulse.

Remove ignition timing unit  
(do not remove plug).

Connect oscilloscope as per  
operating instructions with  
program switch in "special"  
position.

MOT 201 for example:

Red clamp to timing-advance  
unit plug term. 7 (measured  
signal.)

See top picture.

Black clip to vehicle ground.  
Start engine.

The oscilloscope must show a  
rectangular pulse. See  
diagram.

Rectangular pulse present?

no

Disconnect ignition distributor plug and timing-  
advance unit plug.

Connect ohmmeter to:

Ignition distributor  
plug

(Centre picture Item 6)

Timing-advance  
unit plug

(Centre pict. Item 7)

Term. 7h

and

Term. 7h

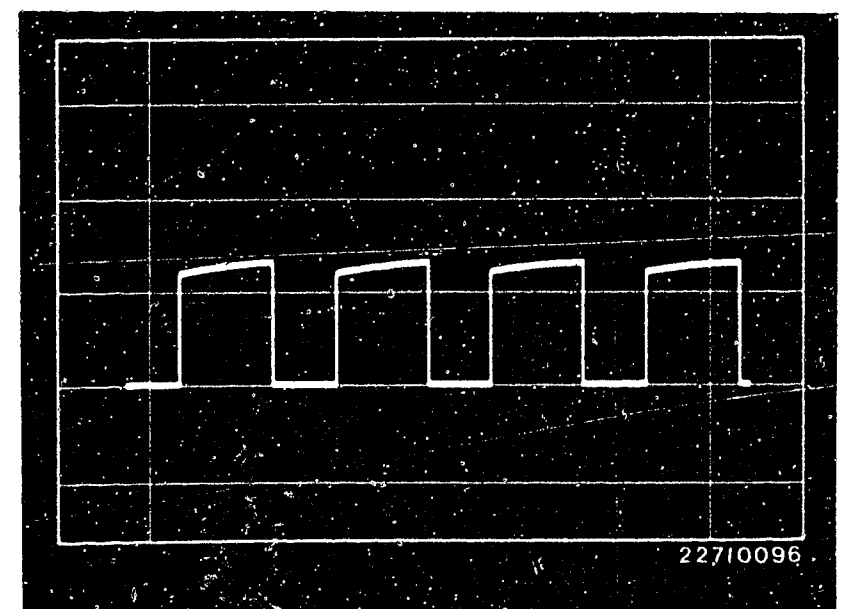
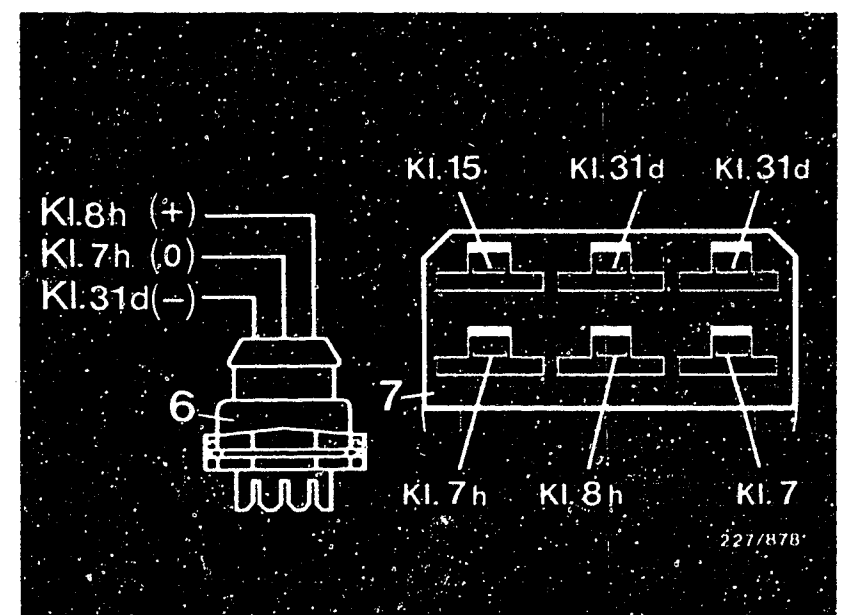
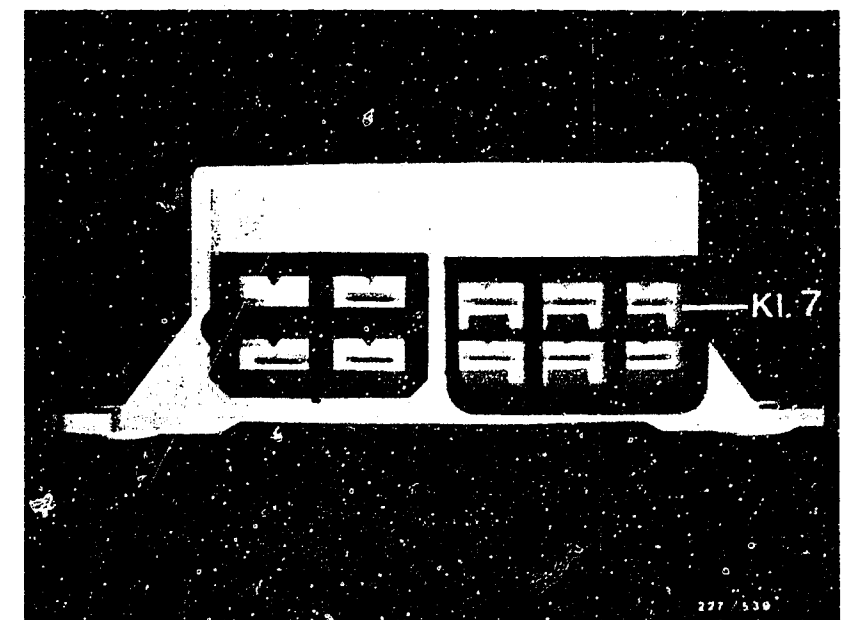
Ohmmeter must indicate approx. 0  $\Omega$  (continuity).

Eliminate open circuit.

If there was no open circuit, replace timing-  
advance unit.

yes

Continued on F13/F14



F11

Trouble-shooting program

Peugeot



F12

Trouble-shooting program

Peugeot





yes

### Test knock control unit.

Switch off ignition.

Remove knock control unit.

Disconnect plug and push back handle cover after removing fastening screw and sealing rubber.

Connect knock control unit plug.  
See top picture.

Connect oscilloscope according to operating instructions with program switch in "special" position.

For example, MOT 201:  
Red clamp to knock control unit plug term. 13 (measured signal).  
See top picture, Item 2.  
Black clamp to vehicle ground.

Start engine.

Oscilloscope must indicate a rectangular pulse.  
See centre picture.

Rectangular pulse present?

yes

Continued on F17/F18

no

Switch off ignition.

Disconnect knock control unit plug and timing-advance unit plug.

Connect ohmmeter to:

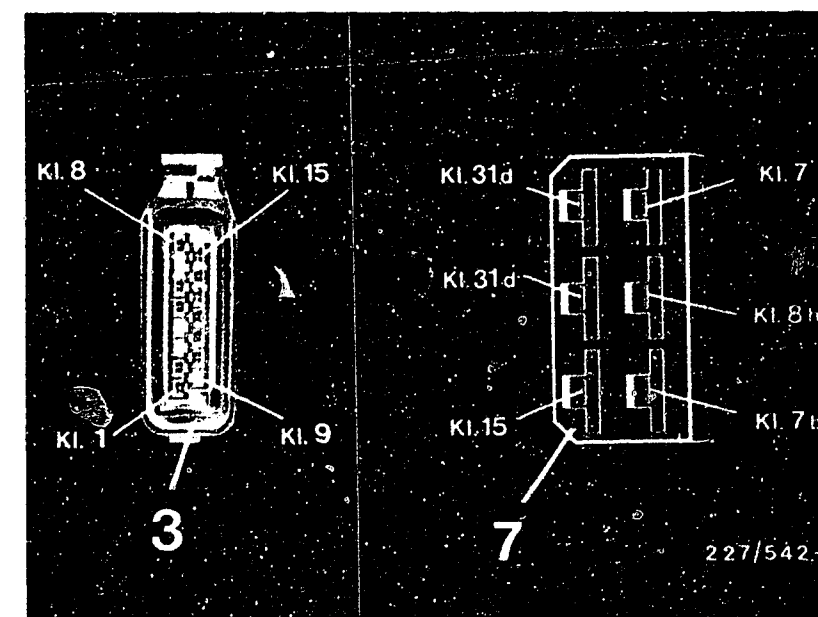
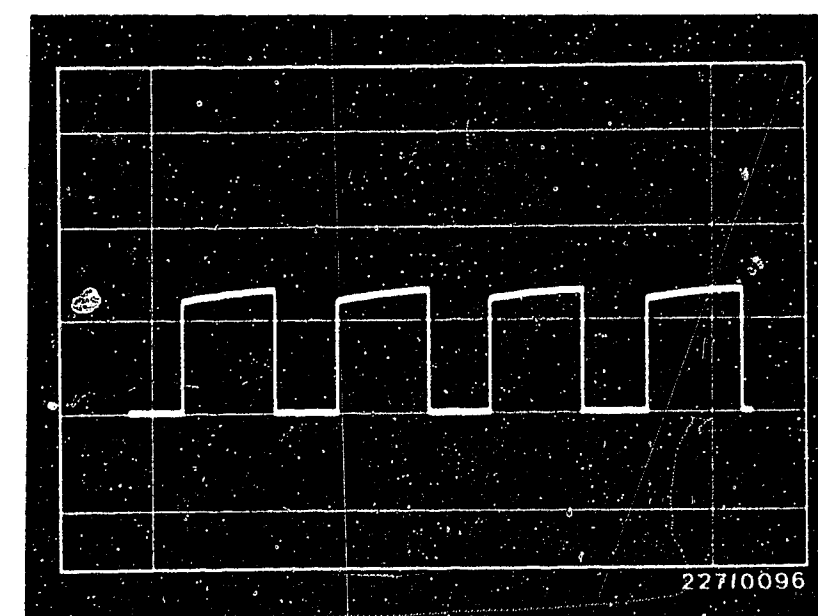
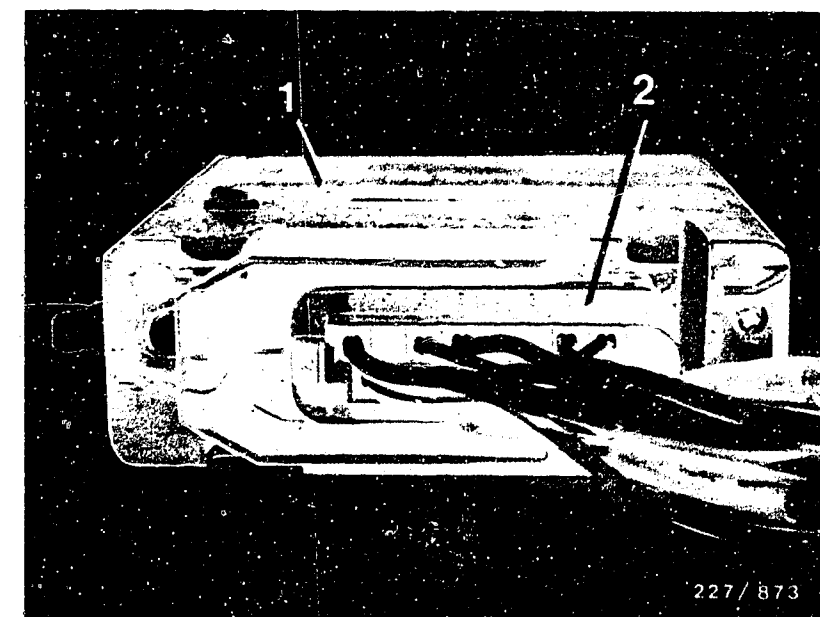
<u>Knock control</u>	<u>Timing-advance</u>
<u>unit plug</u>	<u>unit plug</u>
(Bottom picture, Item 3)	(Bottom picture, Item 7)

Term. 6 and Term. 7

Ohmmeter must indicate approx. 0  $\Omega$  (continuity).

Eliminate open circuit.

Continued on F15/F16



**F13**

Trouble-shooting program  
Peugeot



**F14**

Trouble-shooting program  
Peugeot



Continued

Ignition relay plug

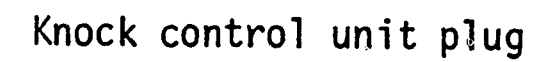
(Arrow-bottom pict.)

Battery negative

Term. 31

If there was open circuit, replace knock control unit.

Continued on F17/F18



yes

Test trigger box control line.

Remove trigger-box plug.  
See top picture.  
Connect oscilloscope as per operating instructions with program switch in "special" position.

For example, MOT 201:  
Red clamp consecutively to trigger-box plug term. 5 and 6 (measured signal).  
See top picture.

Black clip to vehicle ground.  
Start engine.  
The oscilloscope must show a rectangular pulse at both terminals. See diagram. See centre picture.  
Rectangular pulse present?

no

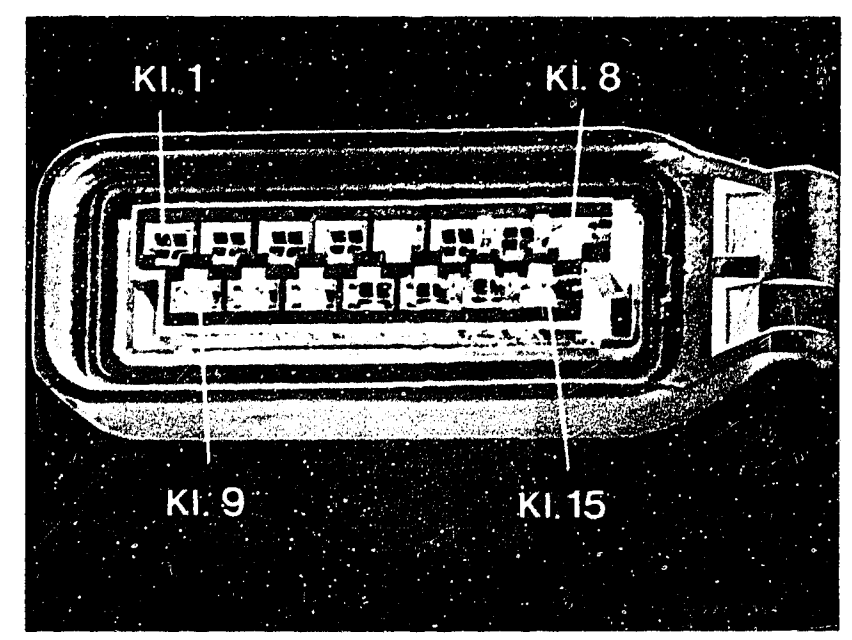
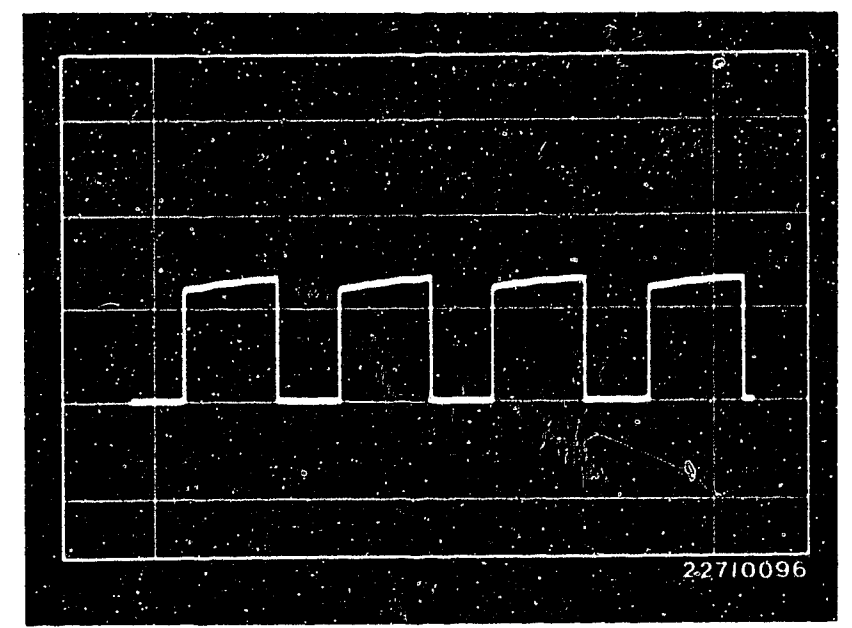
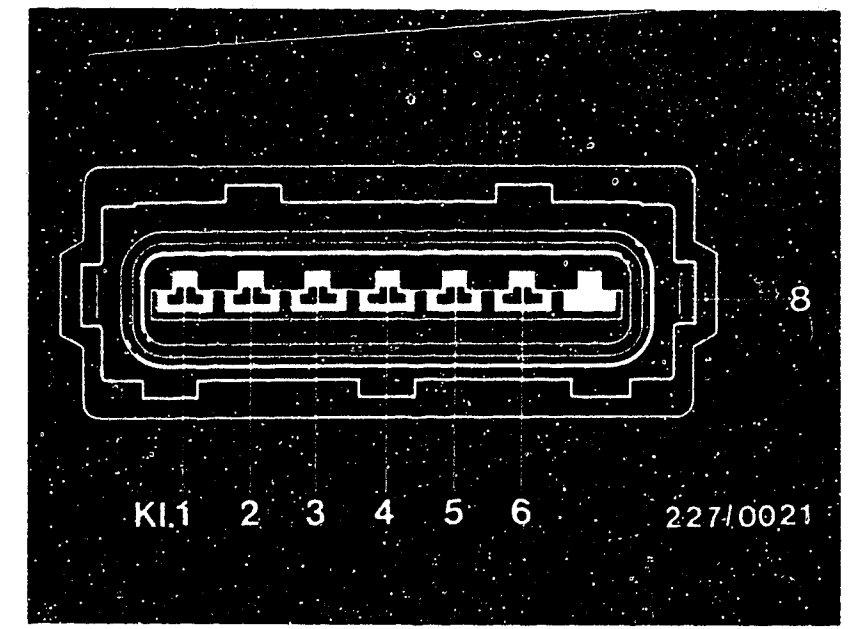
Switch off ignition.  
Disconnect knock control unit plug.  
See bottom picture.  
Connect ohmmeter consecutively to:

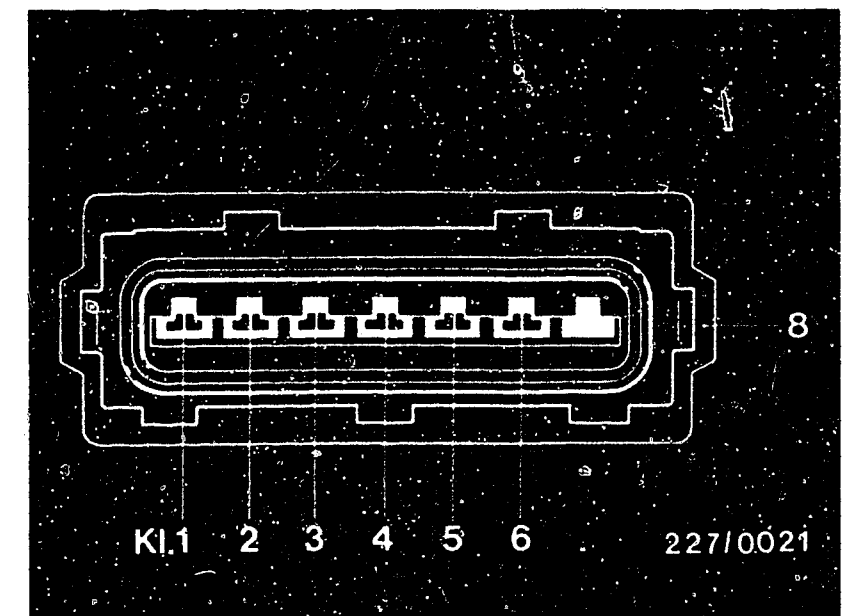
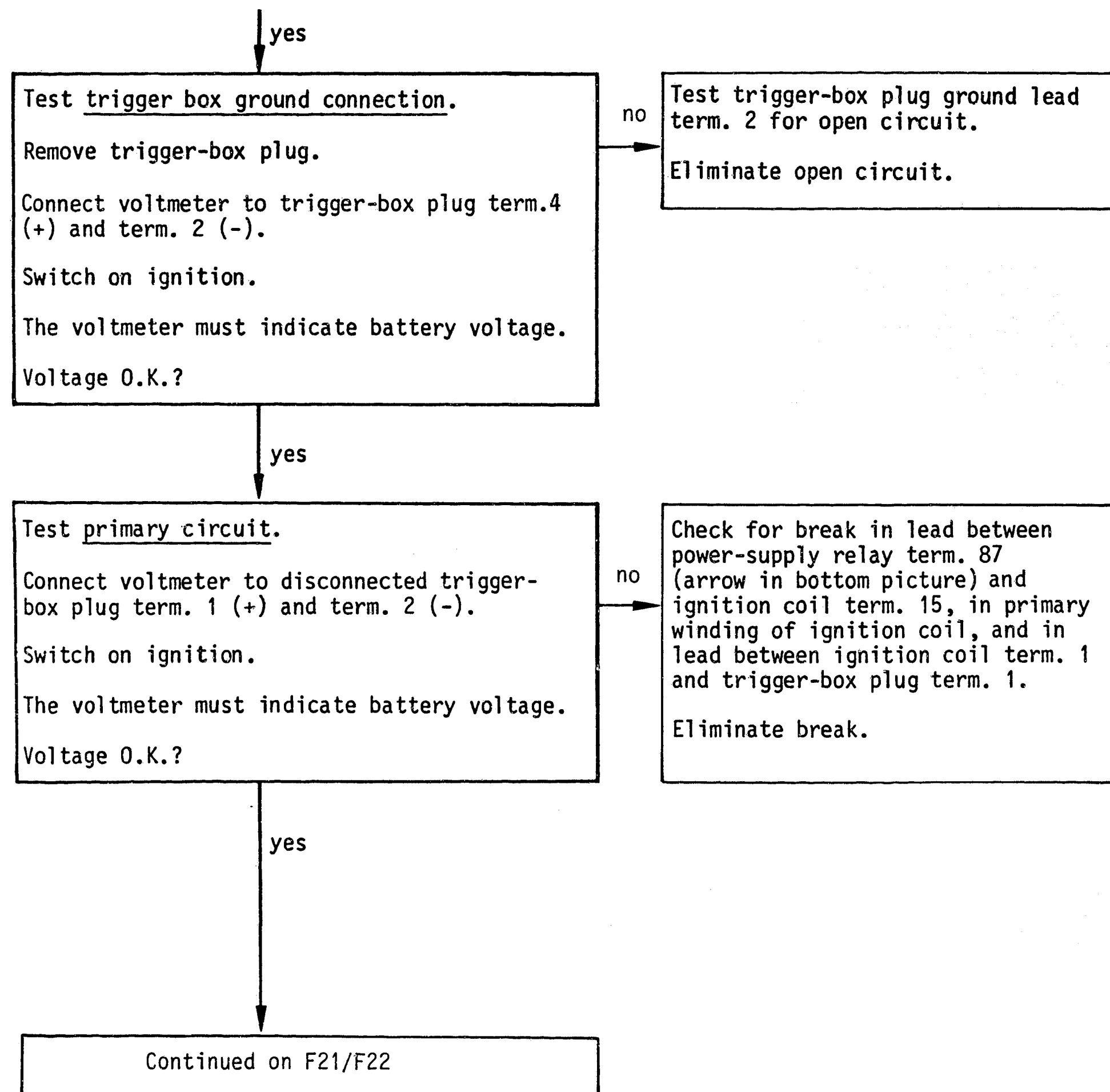
<u>Knock control unit plug</u>	<u>Trigger-box plug</u>
Term. 13	and Term. 5
Term. 13	and Term. 6

Ohmmeter must indicate approx. 0  $\Omega$  (continuity).  
Eliminate open circuit.

yes

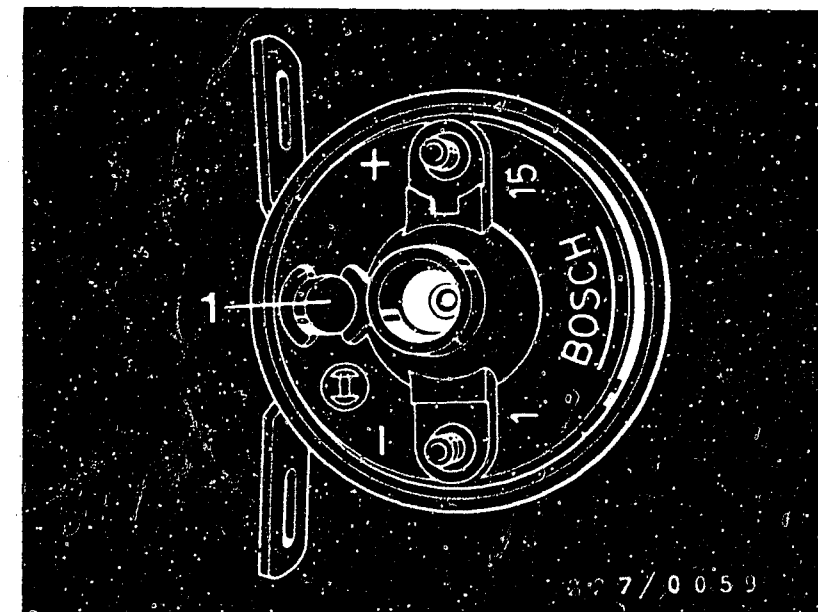
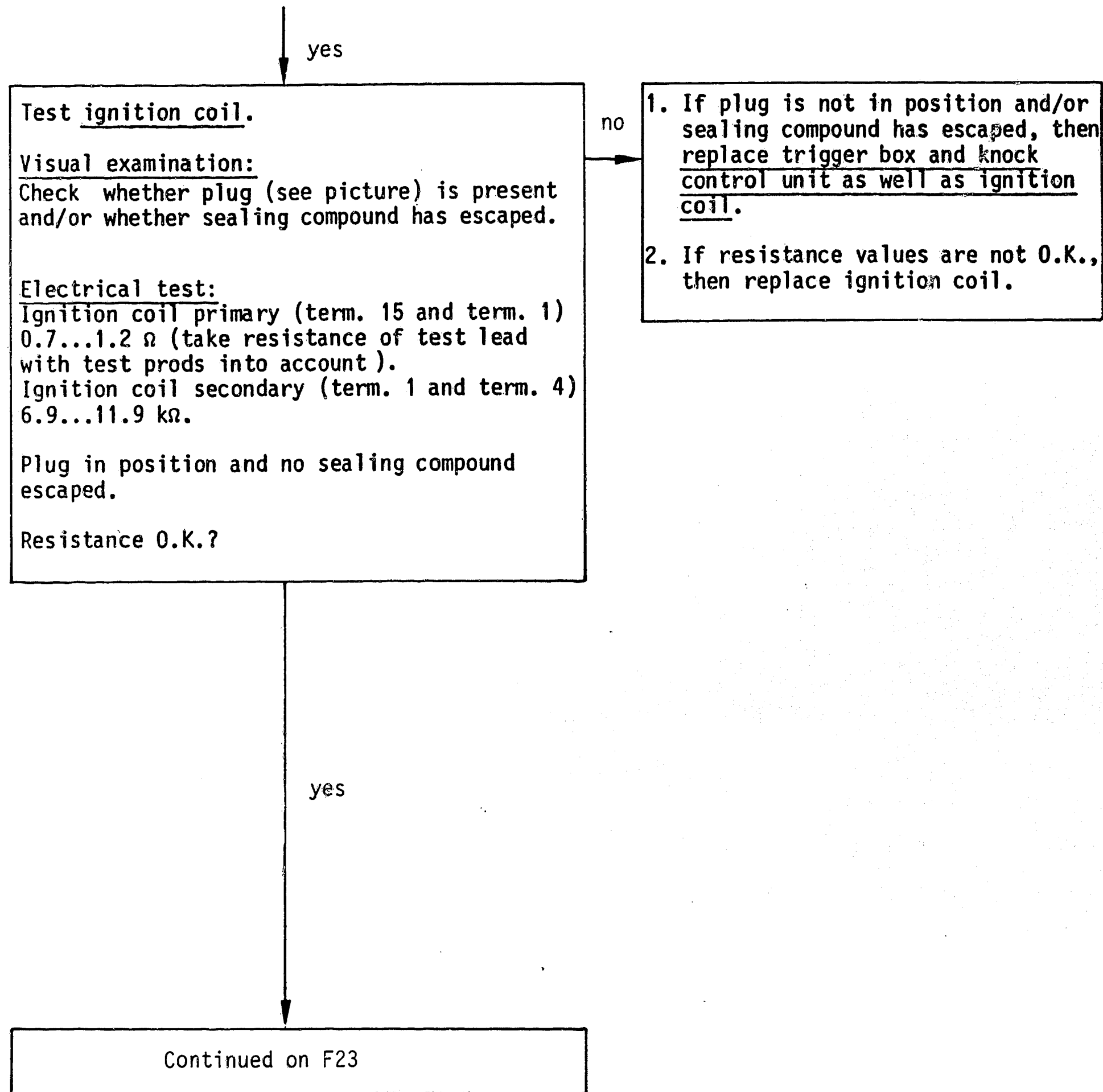
Continued on F19/F20





8 = Trigger-box plug





1 = Plug



yes

If all test steps O.K. and still no primary signal and/or ignition spark available, try installing "new" ignition coil specified.

If primary signal and/or ignition spark still not available, reinstall "old" ignition coil and replace trigger box.

End of testing.

Testing as of C15 not necessary.

Comment:

If customer complaint still not eliminated, further possible faults are in the fuel system, or engine not mechanically O.K.



# After-sales Service

## Technical Bulletin

Only for use within the Bosch organization. Not to be communicated to any third party.

22

### Danger of Accident on Semi-conductor Ignition Systems

VDT-I-227/102 B

11.1976

Please be sure to pass this bulletin on to your employees for their attention.

The increased demands made on their ignition systems by modern engines, and the wish for freedom from maintenance, led some time ago to manufactures starting to equip their vehicles with semi-conductor ignition systems as original equipment. In most cases the performance of nearly all makes of such systems is higher than that of conventional systems, and further improvements are to be expected. This means that semi-conductor ignition systems have reached the point where contact with "live" parts or contacts (whether on the primary side or the secondary side) can prove fatal.

In this connection we should like to point out to you that the laws valid in your country regarding work on high-voltage systems must be adhered to when working on, or testing, semi-conductor ignition systems.

As a matter of principle, when working on such ignition systems the ignition is to be switched off. Included in such work are the following operations:

- Connection of engine testing equipment (timing light, dwell-tach tester, ignition oscilloscope etc.).
- Replacement of ignition system parts (spark plugs, ignition coil, ignition distributor, H.T. ignition cables etc.).

If it is necessary to switch on the ignition in order to test the system or make adjustments on the engine (to the carburetor for instance), then lethal voltages are present throughout the entire system.

This means that the danger of accident exists not only at individual components in the system (e.g. ignition distributor, ignition coil, trigger box, ignition harness), but also at the wiring harness (e.g. connection for the tachometer, diagnostic connector), on terminals, and on test equipment.

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**N1**

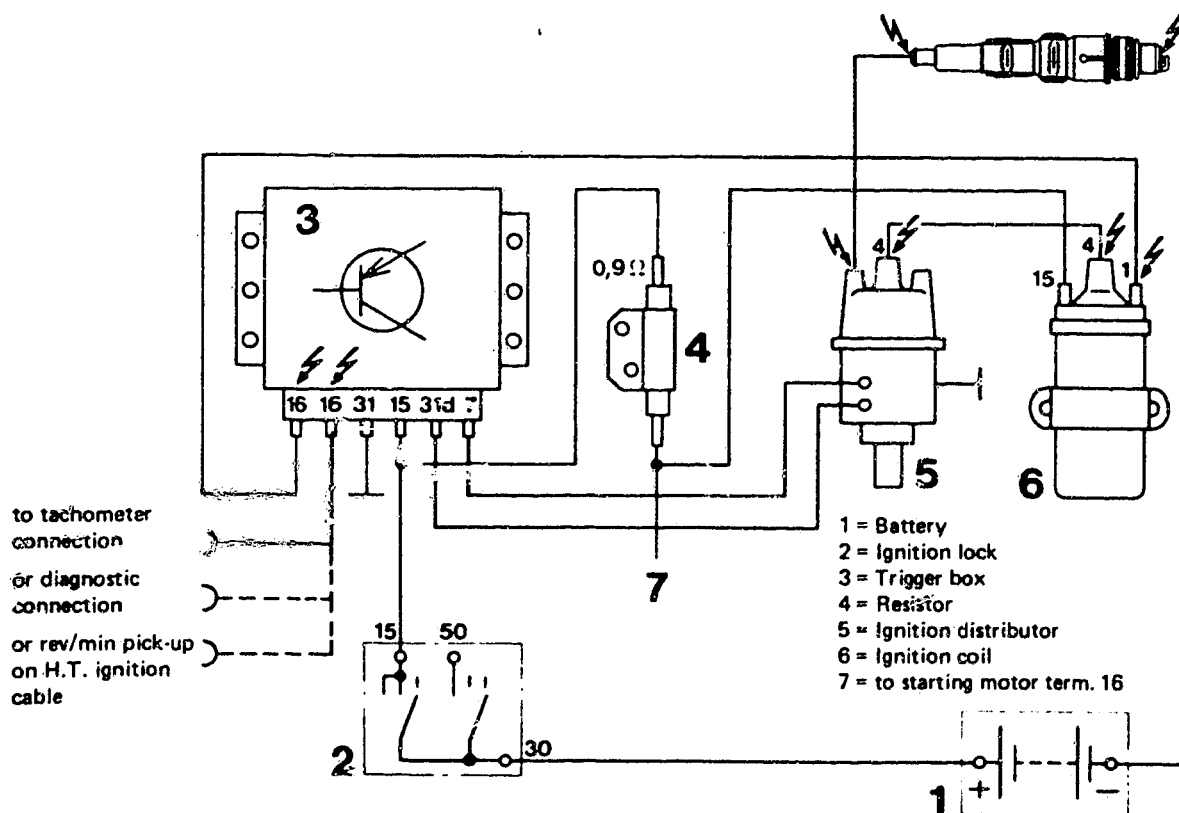
Technical Bulletin

Peugeot



- Operation of the trigger box without the ignition transformer.
- At the trigger box, (removed), relatively soon after it has been switched off (capacitor discharge).

Please address any queries or comments concerning the contents of this publication to our representative in your country.



### Terminal diagram



# After-sales Service

## Technical Bulletin

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EFFECTS OF ELECTRICAL AND ELECTRONIC  
SYSTEMS ON HEART PACEMAKERS

VDT-I-227/107 En

1.1981

e.g. ignition systems, Jetronic, Motronic, ABS

Please ensure without fail that this Bulletin is passed on to your employees for their attention!

We have often been asked by some of our customers whether or not patients with heart pacemakers are endangered in any way by ignition systems. This theme was recently the subject of an examination carried out by the Ignition System Development Department of Robert Bosch GmbH in conjunction with Dr. Thull, lecturer at the Central Institute for Biomedical Technology at the University of Erlangen-Nürnberg and Biotronic GmbH & Co. of Berlin, a manufacturer of heart pacemakers. The magazine "Biomedizinischen Technik" (5/80) listed the results.

The most important discoveries in this practice can be summarized from the examination report as follows:-

1. Heart pacemakers corresponding to the latest state of the art are not affected by radiation (electromagnetic fields) from ignition systems.
2. With a stationary engine and the ignition switched off the heart pacemaker is not affected by any part of the ignition system, even when unintentionally touched. Maintenance work in the engine compartment, for example, can then be carried out without any danger.
3. With the engine running or stationary with the ignition switched on, touching current-carrying parts of the ignition system, as well as parts of any other electrical system, presents a certain danger for everybody. The heart pacemaker can here be affected under certain conditions (voltage, current and frequency).  
Patients with heart pacemakers should therefore at all costs avoid touching current-carrying parts of electrical systems.
4. Furthermore, patients with heart pacemakers are more inclined to psychic shock effects than other people, even when they receive just a harmless electric shock, because many such patients are conscious of the increased danger to the cardiac activity.

We therefore consider it inadvisable for patients with heart pacemakers to be employed in workshops or on vehicles where ignition systems are being tested or repaired. If any members of your staff have heart pacemakers please carry out the necessary measures.

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**N3**

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We would like to add that heart pacemakers are not expected to be affected in any way by interference from other electronic products and systems which we manufacture, such as the Antiskid System (ABS), Jetronic, Motronic, because the much greater radiation intensity of the ignition systems examined in normal use has not caused any interference to heart pacemakers corresponding to the latest state of the art.

If you should receive questions on this matter from customers, please inform them accordingly.



# After-sales Service

## Technical Bulletin

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### BREAKERLESS TRANSISTORIZED IGNITION SYSTEM

22

#### Warranty note

VDT-I-227/103 En  
3.1979

Hybrid construction trigger boxes  
0 227 100 100 for ignition distributor  
with Hall generator (TCI-h)  
0 227 100 102 for ignition distributor  
with induction-type  
pulse generator (TCI-i)

Apart from the well-known TCI trigger boxes 0 227 100 0.., trigger boxes of hybrid construction have been fitted as standard since 9.78 (Fig. 1).

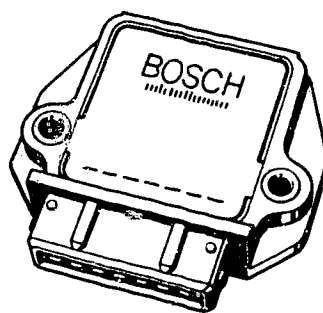


Fig. 1

#### Warranty procedure

If the complaints are justified, all these hybrid trigger boxes are to be sent, along with completed warranty documents, to your authorized representative for forwarding to the following address:

ROBERT BOSCH GMBH  
KH/LAV - Auspackraum

zur Weiterleitung an K1/VAK 21

D-7000 Stuttgart 30

This instruction remains valid until further notice.

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# After-sales Service

## Technical Bulletin

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### NEW DESIGNATIONS FOR IGNITION SYSTEMS

VDT-I-227/108 En

1.1983

The introduction of new ignition systems has made it necessary to reclassify all designations.

The designations listed below will be used immediately in KH workshop and sales literature.

Designation	Abbrev'd code	Meaning	Switching	Ignition control and spark advance	High-voltage distribution
Coil ignition	SZ (CI)	-----	Mechanical (breaker points)	Mechanical (ignition distributor)	Mechanical (ignition distributor)
Transistorized coil ignition	TSZ-K (TCI-c)	K=breaker-triggered	Electronic (trigger box)	Mechanical (ignition distributor)	Mechanical (ignition distributor)
Trigger box with conventional circuit techniques	TSZ-I* (TCI-i)	I=Induction-type pulse generator	Electronic (trigger box)	Mechanical (ignition distributor)	Mechanical (ignition distributor)
	TSZ-H	H=Hall generator	Electronic (trigger box)	Mechanical (ignition distributor)	Mechanical (ignition distributor)
Transistorized ignition	TZ-I* (TI-i)	I=Induction-type pulse generator	Electronic (trigger box)	Mechanical (ignition distributor)	Mechanical (ignition distributor)
(Trigger box in Hybrid technique)	TZ-H* (TI-h)	H=Hall generator	Electronic (trigger box)	Mechanical (ignition distributor)	Mechanical (ignition distributor)



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Designation	Abbrev'd code	Meaning	Switching	Ignition control and spark advance	High-voltage distribution
Breakerless semiconductor ignition with or without knock control	EZ EZ-K	- K=Knock control	Electronic (trigger box or control unit)	Electronic (control unit)	Mechanical (ignition distributor or high-voltage distributor)
Distributorless ignition with or without knock control	VZ VZ-K	- K=Knock control	Electronic (control unit)	Electronic (control unit)	Electronic (dual-spark ignition coil, or 1 ignition coil for each spark plug)

\*Note: The ignition system can also be equipped with a DLS unit (digital idle stabilization) or with an ELS unit (electronic idle stabilization) or with an ESV unit (electronic ignition retardation).



# After-sales Service

## Motor Vehicle Service Information

Only for use within the Bosch organization. Not to be communicated to any third party.

INCORRECT DISPLAY OF ROTATIONAL SPEED AND  
DWELL ANGLE ONLY WITH TRIGGER BOXES  
0 227 100 ... (TCI-i, TCI-h) WITH CURRENT  
LIMITATION

VDT-I-Gen. 030 En  
6.80  
Supersedes Ed. 3.80

For additional information see VDT-I-Gen. 032 En

### 1. General

In comparison with conventional ignition systems, transistorized ignition systems with current limitation have different primary voltage characteristics. During the dwell period the voltage at terminal 1 of the ignition coil may assume values from 1.5 V to battery voltage (or greater). This may lead to an incorrect display of rotational speed and dwell angle when testing the ignition system. However, there is no functional defect in the ignition system, and, for this reason, the trigger box must not be replaced. Incorrect displays may occur with the testers listed below:

MOT 001.00}	Rotational-speed	KTE 001.00
001.01}	display O.K. with these	001.02
001.02	testers	001.03
001.04		
002.00		

By now, the following vehicles may be fitted with breakerless ignition systems with current limitation:

Audi	(Bosch/Fairchild- ignition system)	Mazda	(Mitsubishi ignition system)
BMW	(Bosch ignition system)	Mitsubishi	(Mitsubishi ignition system)
Citroen	(Delco ignition system)	Nissan-Datsun	(Hitachi ignition system)
Fiat	(Delco ignition system)	Peugeot	(Bosch ignition system)
Ford	(Delco ignition system)	VW	(Bosch/Fairchild ignition system)
General- Motors	(HEI-ignition system)	Bosch transistorized ignition system for retrofitting 0 227 100 920	

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**N8**

Motor Vehicle Service Information  
Peugeot



## 2. Test instructions

### 2.1 Rotational speed

Incorrect rotational-speed display can be recognized as follows:

If one starts at the idle speed and slowly increases the engine speed, then the incorrect display can be recognized by an abrupt reduction in the rotational-speed display (e.g. from 2400 min<sup>-1</sup> to 1200 min<sup>-1</sup>).

It is, however, possible to attain correct rot.-speed measurements as follows:

Connect a ballast resistor of 0.9 or 1.0 Ohm (see Fig.) in series in the line to term. 15 of the ignition coil (take care not to cause a short circuit). After the rotational-speed measurement, the ballast resistor must be removed (otherwise starting difficulties and misfiring). Connect tester as per operating instructions.

### Suggestion for user manufacture

Required parts:

- 1 ballast resistor 0.9 Ohm
- or
- 1 ballast resistor 1.0 Ohm
- 2 blade receptacles e.g.
- approx. 0.2 m cable, 1.5 mm<sup>2</sup> e.g.
- 2 insulated clips

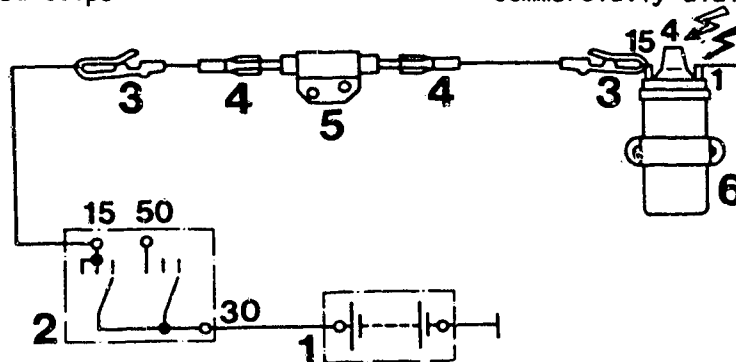
Part No. 0 227 900 002

Part No. 0 227 900 101

Part No. 1 901 355 881

Part No. 6 210 150 150

Commercially available



- 1 = Battery
- 2 = Ignition switch
- 3 = Clips

- 4 = Blade receptacle
- 5 = Ballast resistor
- 6 = Ignition coil

⚡ approx. 400 V

⚡ approx. 25 kV

### 2.2 Dwell angle

The dwell angle is electronically controlled. A measurement of the dwell angle is no longer performed.

### 2.3 Ignition point

Is displayed correctly. Connect tester as per operating instructions.



# After-sales Service

## Motor Vehicle Service Information

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### MOTORTESTER CONVERSION

Incorrect display of rotational speed,  
dwell angle and ignition point  
only with trigger boxes  
0 227 100 ... (TCI-i, TCI-h) with current  
limitation

VDT-I-Gen. 032 En  
6.80

For additional information see VDT-I-Gen. 030 of 6.80

Re.: Motortester EFAW 268  
268 S 10  
269  
214 B  
AE 2000

#### 1. General

Please make sure that the above-mentioned motortesters in your workshop and at your customers (e.g. motor vehicle workshops, oil companies, gas stations, vocational schools etc.) are converted. The conversion is subject to payment and is carried out by the K7 after-sales service of the responsible BG. The standard time is 15 work units (with fitting of switch).

#### 2. Why motortester conversion?

In comparison with conventional ignition systems, transistorized ignition systems with current limitation have different primary voltage characteristics. During the dwell period the voltage at terminal 1 of the ignition coil may assume values from 1.5 V to battery voltage (or greater). This may lead to an incorrect display of rotational speed and dwell angle as well as to incorrect triggering of the meter when testing the ignition system. There is, however, no functional defect in the ignition system, and, for this reason, the trigger box must not be replaced. Since, with the above-listed motortesters, the timing light is triggered by the signal path dwell angle - meter, this incorrect triggering also leads to incorrect flashing and thus to an incorrect display of the advance angle.

#### 3. Conversion measures

The situation is to be remedied by modifying the wiring of the testers so that the timing light is triggered by the clamp-on induction pickup and the pulse shaper stage.

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**N10**

Motor Vehicle Service Information

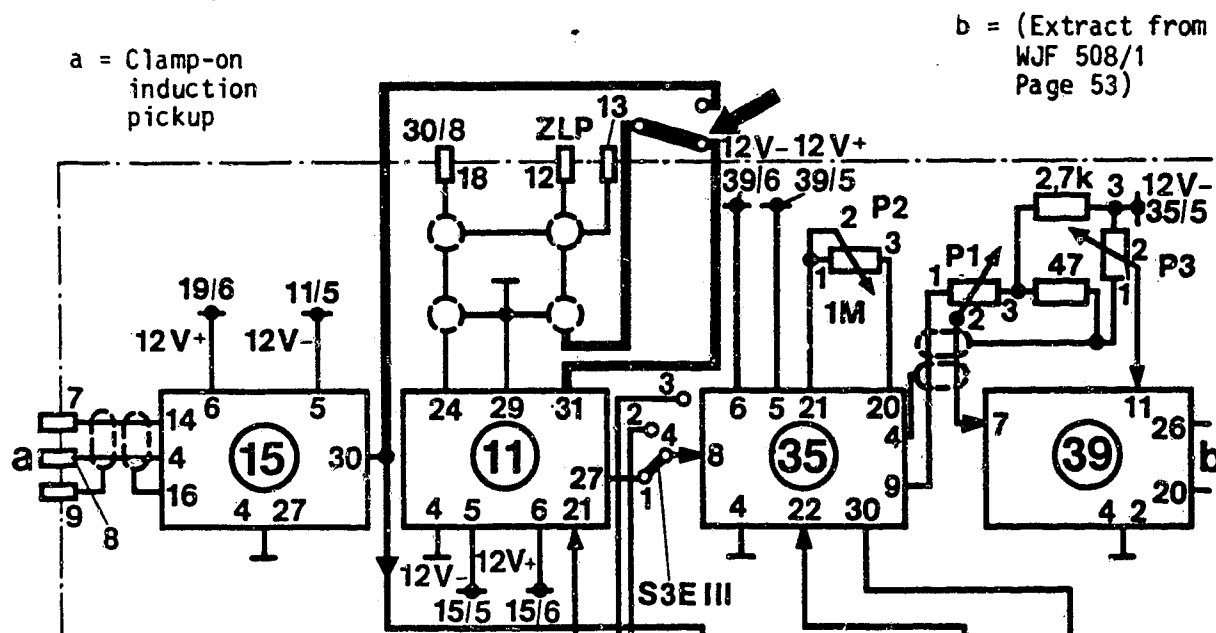
Peugeot





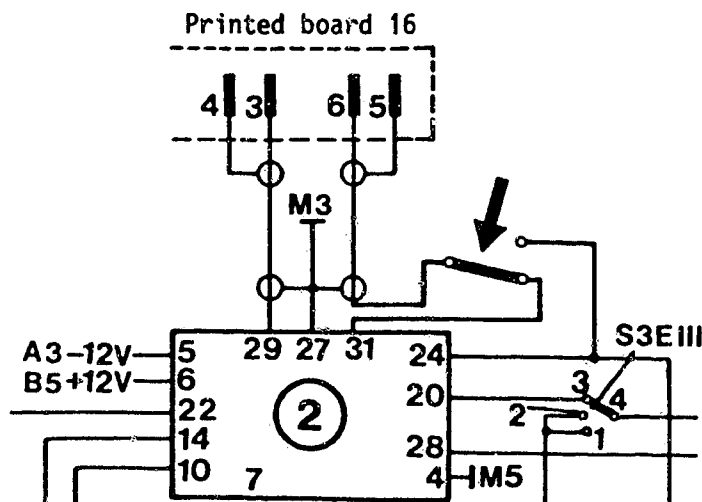
Remove the line of the ZLP\* from pin 31 of printed board 11 (coupling stage) and connect to pin 30 of printed board 15 (pulse shaper stage) via a switch with change-over contact (e.g. 0 341 500 803). In addition, a new line must be connected from pin 31 of printed board 11 to the other contact of the switch with change-over contact. Arrow points to switch with change-over contact.

\* ZLP = timing light



## EFAW 214 B

Remove the line from terminal 6 of printed board 16 to pin 31 of printed board 2 (coupling stage) and connect to pin 24 of the same printed board via a switch with change-over contact (e.g. 0 341 500 803). In addition, a new line must be connected from pin 31 of printed board 2 to the other contact of the switch with change-over contact. Arrow points to switch with change-over contact.



By fitting the switch with change-over contact in the front panel of the motor-tester, it is possible to switch over from standard ignition systems to those with current limitation. We recommend that the switch positions be marked correspondingly: e.g. "standard" - "current limitation". These conversion measures have already been published in the K7 information sheet KJF 28/7911.

#### 4. Test instructions

##### 4.1 Standard ignition systems

Switch position: "standard"

All other tester connections as per operating instructions.

##### 4.2 Ignition systems with current limitation

Switch position: "current limitation"

In order to trigger the timing light, the induction-type pulse generator (clamp-on pickup or red pickup) must always be connected during the measurement.

The selector switch for ignition systems built into the motortester must be switched to standard coil ignition (not to TCI) with these ignition systems.

All other tester connections as per operating instructions.

The dwell angle is electronically controlled. A measurement of the dwell angle is no longer performed.



# After-sales Service

## Motor Vehicle Service Information

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TESTS ON ELECTRONIC IGNITION SYSTEMS  
(TCI, TZ)  
TESTER INSTRUCTIONS

VDT-I-Gen. 035 En  
3.1981

The following tests are listed in older and current Tester operating instructions or in Trouble-shooting with the oscilloscope:

- "Separate ignition coil test" (concerns EFAW 213, 214, 268, AE 2000).
- "Calculating the "ignition voltage reserve" (concerns EFAW 213, 214, 268, AE 2000 and MOT series).
- "Intensified insulation test" (concerns EFAW 213, 214, 268, AE 2000 and MOT series).

Nowadays transistorized ignition systems deliver more than 30,000 V secondary voltage.

To avoid damage to ignition coil, ignition cable and ignition distributor by voltage flashovers, the tests listed above should not be carried out on transistorized ignition systems.

The contents of this Service Information has already been published in the K7-Information K7-VJF 17/8012.

**BOSCH**

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**N13**

Motor Vehicle Service Information

Peugeot



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